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NEW SPECIES OF PHILIPPINE FISHES.

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The present paper is based on the study of about ten thousand specimens of fishes collected in the Philippine Islands by the author and his native assistants, C. Canonizado and Datto Alli, during 1907 and 1908. The collections were made in almost all the important islands of the Archipelago. All of the specimens were taken to Stanford University and compared with the material in the collection of that institution which included a number of types. All types mentioned in this paper are in the ichthyological collection, Bureau of Science, Manila, P. I.

I take this opportunity to thank President David Starr Jordan for valuable suggestions in regard to the work.

Family MURÆNIDÆ. The Morays.

Gymnothorax indong[1] Seale, sp. nov. [Indong-indong.]

[2] Head 3.50 in body to anal pore; tail is longer than the body by a distance equal to about two-thirds of head; eye 2 in snout; snout 5 in head; interorbital space equal to eye. Mouth large, the jaws not closing completely, mandible 1.70 in head; gape 2. Teeth strong and saber-like,

[1] Indong is a Moro name for Morays.

[2] All comparative measurements in this paper are taken in the length from tip of snout to end of last caudal vertebra, and the head is measured to posterior edge of hard operculum and excluding the membraneous opercular flap. Scale count is to end of caudal vertebra, the vertical series being counted at origin of anal, unless otherwise stated.

in a single series in each jaw. Three large median canines anteriorly, no teeth on shafts of vomer except a few small ones at its extreme posterior end. Posterior nostrils consisting of a large round pore situated just above the anterior half of iris, anterior nostrils consisting of two tubes at extremity of snout, their length about two-thirds of eye. Between the nostrils, the skin on sides of snout has a loose fold capable of dilatation. Dorsal fin is low, beginning slightly anterior to gill opening, which is of moderate size, being about equal to eye. Origin of anal fin at anal pore, fins are low, the dorsal the highest, its longest rays being almost equal to snout. The fins are continuous around caudal.

Color in life, brown with irregular-shaped black blotches, which assume the form of irregular, broken vertical bands slightly less than interspaces. Head has a distinct elongate white mark between eye and gape of mouth, this white stripe penetrates the lower portion of a large blackish blotch bordering the posterior portion of eye; another short white stripe from anterior border of eye to middle of maxillary. A black blotch in angle of jaws which is bordered anteriorly by an elongate white stripe on the mandible. A dusky area crossing near the posterior portion of lower jaws, this area with a white median line. Throat crossed with narrow white lines, pores of jaws white, the fins are barred with black.

Color in alcohol similar but slightly faded.

Type is No. 4445, a specimen from Zamboanga, Mindanao, P. I., 16 June, 1908. Length, 385 millimeters.

Gymnothorax samalensis Seale, sp. nov.

Head 3.80 in body; body is shorter than tail by a distance equal to under jaw; gape of mouth 2.70 in head; snout 6.75 in head; eye 1.25 in snout; interorbital space, measured to include soft portion, is equal to eye; posterior nostrils round, pore-like; openings of nostril just above eye; anterior nostrils consisting of two rather long tubes at end of snout, their length about two-thirds of eye. Teeth of upper jaw in a single series except in front where there are several enlarged canines, four enlarged depressible ones in the median line; vomerine series single, about 10 in number, short and rounded. Teeth on lower jaw in a single series except in front, where there are about five or six enlarged depressible canines on each side. Origin of dorsal, a distance equal to length of snout in front of gill openings. Origin of anal directly back of anal pore, the fins of moderate length.

Color in alcohol brownish with indistinct darker cross-bands, more numerous and distinct on posterior of tail, almost obliterated anteriorly; belly and throat yellowish. A distinct white blotch on lower jaw just in front of angle. A white spot on upper jaw below eye and another halfway between eye and tip of snout; these form rings around the mucous pores. Three similar white spots on lower jaw. Top of head and snout

brown, the color fusing gradually with the yellowish of the under jaw and throat.

Type is No. 3781 from Samal Island, Gulf of Davao, Mindanao, P. I., 1 May, 1908. Length, 220 millimeters.

Family OPHICHTHYIDÆ.

Jenkinsella oliveri Seale, sp. nov.

Head 5.10 in body; body 1.80 in tail; gape 1.75 in head; snout 5.75 in head; eye 1.75 in snout; interorbital space about equal to eye; upper jaw projecting beyond lower by a distance equal to eye; upper lip well fringed; mouth large; mandible 2.50 in head. Teeth in lower jaw in two rows, short sharp teeth, no canines. Teeth of upper jaw in two rows on sides, the inner row being larger and depressible; vomerine teeth in two series, uniting posteriorly into one; a patch of 8 or 10 sharp teeth at tip of upper jaw; no canines; posterior nostrils with an inflated membraneous opening more or less fringed. Their location midway between eye and anterior nostril; the anterior nostril is tube-shaped, near end of snout, length about two-thirds length of eye. Several distinct pores on head, one just above and in front of eye, another on middle posterior portion of interorbital space. Origin of dorsal fin about the length of pectorals in front of the gill openings and extending to tip of caudal, its longest rays slightly more than half depth of body, pectorals 3.30 in head. Origin of anal directly behind anal pore, it extends to tip of caudal, no caudal fin.

Color, light yellowish brown above, yellow below median line, belly whitish, sides finely punctulate with minute black specks, throat white, top of head brown, these two colors uniting in a sharp line on the middle of side of head, extending from angle of fins to gill openings; tip of snout and anterior portion of dorsal darker.

Type is No. 4299 from Zamboanga, Mindanao, P. I., 2 June, 1908: Length, 360 millimeters.

Moringua cagayana Seale, sp. nov.

Head 8.75 in body to anal opening, the caudal being just one-third of total length from tip of snout to tip of caudal; angle of mouth 4.50 in head; snout 8; eye 2.25 in snout; interorbital 1.10 in snout; pectorals equal to distance from tip of snout to posterior of eye. Origin of dorsal fin posterior to vent by a distance equal to the length from tip of snout to tip of pectorals, its origin being over the anterior third of anal, the fin is then high and distinct for about this same distance when it becomes atrophied, reappearing again near tip of tail to form part of the paddle-shaped end of caudal. The anal fin is similar to dorsal but its origin is nearer the anal pore. Both the anal and dorsal widen at the end of tail and unite with caudal forming a wide paddle or fin-like end to the

fish, the caudal is lunate, its length equal to upper jaw. A single row of rather short strong canine teeth in each jaw and irregular double row of the same kind down shaft of the vomer. Posterior nostril consisting of a large round open pore with a membrane on its anterior margin. Anterior nostril consisting of a small round pore with a membraneous cover formed something like lips to the small central opening, each nostril on a line in front of eye. Buccal cavity large and baggy.

Color yellow brown, the posterior of tail and the head brown, a black line along the entire dorsal surface, angle of jaws white, fins brown except pectorals which are yellowish.

Type is No. 1621 caught in the sea near Cagayan, Mindanao, 13 September, 1907.

Probably the form most nearly related to this species is *M. bicolor*.

Family CYPRINIDÆ. The Minnows.

Barbus ivis Seale, sp. nov. Plate I. [Ivis.]

Head without opercular flap 3.75; depth 2.55; dorsal 10; anal II, 6 (not counting branch on last ray) scales 4–23–3, the lateral line curves down to a little below median line of sides, then up again to middle of caudal peduncle; eye 4.70 in head; snout 3.50; interorbital space 2.35; maxillary 3.10 in head, its end under anterior margin of eye. Two maxillary barbules on each side, the lower one the longest, its tip reaching to angle of preopercle; mandible 2.55; pectorals 1.15; ventrals 1.45.

Body is oblong compressed, the upper outline between the spinous dorsal and head is distinctly gibbous; the lower outline from anal to tip of snout is a low even curve, the profile of head from nape to tip of snout is practically straight. The greatest depth of the body is at origin of ventrals. Length of caudal peduncle 1.50 in head, its least depth 1.75; its median width 6.50. The upper portion of head is somewhat rounded, the interorbital space is very slightly convex. Snout is rounded at tip, its median width is slightly greater than its length; anterior nostril with a funnel-like membrane. Greatest depth of head 1.35 in its length, the greatest width 1.55. Eyes small, less than snout. Mouth small, the upper lip closing over the lower. No teeth except pharyngeals, which are 5–3–2, larger ones slightly hooked with a small shoulder. Gill openings restricted, ending on a line with angle of preopercle.

Gill rakers rather short, shaped something like the pharyngeal teeth with the points exaggerated, 7 on lower limb, the longest 3 in pupil.

Body entirely covered with large smooth scales which have five or six striate lines in the centers. Dorsal and anal with high scaly sheaths, base of caudal scaled, ventrals with a long axillary scale, pectorals without axillary scale. Head entirely naked.

Origin of spinous dorsal midway between end of last caudal vertebra and nostril, the third ray of which is large and modified, the longest being 1.14 in head, its hard portion is distinctly serrated except on its lower third; posterior ray 1.50 in modified ray; base of anal 1.55 in head. Origin of anal is slightly nearer origin of ventrals than to end of caudal vertebra; its longest ray 1.55 in head, its base 2.75, its last ray 3; ventral fins are midway between anal and origin of pectorals, their tip not reaching to anal pore; pectorals low on body. Caudal deeply emarginate, its length a fifth greater than head.

Color in life is grayish above, the margins of the scales darker, shaded with greenish, yellowish on sides, shading into pinkish below. From 3 to 5 black spots along the median area of sides, all specimens have at least an indication of a dusky stripe connecting these spots, some show the stripe very distinctly; a slight dusky blotch just below origin of dorsal, none at origin of anal. The head has some bronzy markings on opercles and in front of eye. Dorsal grayish with dusky tip, caudal pinkish with dusky tip, the lower lobe bright red, anal and ventrals bright red with slightly dusky tips. Pectorals bright red.

Color in alcohol is similar except the dark markings show more distinctly. The lower half of fish is yellowish white, the fins are yellowish, dorsal, caudal, and anal with dusky tips.

Ninety specimens from a small stream near the town of Balabac, Balabac Island. Type is No. 5233, Balabac Island, P. I., taken by the author 11 August, 1908. Length, 130 millimeters.

Family BELONIDÆ. The Gars.

Oxyporhamphus brevis Seale, sp. nov. Plate II. (Bamban).

Head 4.40; depth 8.50; dorsal 15; anal 15; scales are very deciduous, about 50 from axil of pectoral to end of caudal vertebra; eye 3.75 in head; snout 3.20, the width of the free triangular portion of upper jaw considerably greater than its length; maxillary equal to eye; mandible 1.75 in head, the beak on under jaw scarcely developed, its length beyond the end of upper jaw equal to pupil of eye; interorbital space equal to eye; pectorals 1.75 in head; ventrals 2.45.

Body elongate, compressed, length of caudal peduncle 3 in head, its least depth 1.50 in its length, its width 3.

Upper profile of head and snout a low even curve; interorbital space like nuchal region very slightly convex, a wide distinct ridge down the middle of interorbital space; greatest width of head 2.50 in its length, its greatest depth 2.10. The most characteristic thing about the head is the extremely short beak of under jaw which while it varies slightly, in most specimens and in type is nearly equal to width of pupil of eye or 2.50 in snout. Eyes of moderate size, impinging slightly on upper profile; mouth large, teeth in villiform bands in jaws, none on vomer,

palatine, or tongue. Gill openings carried forward to below anterior margin of eye. Gill rakers short, wide at base, sharp, pointed, and denticulate on their inner surface, about 20 on lower limb, the longest less than pupil.

Entire body covered with large, smooth, thin deciduous scales; head naked; vertical fins scaled. Origin of dorsal is just one-third distance between end of caudal vertebra and lower axil of pectorals, its longest ray 1.90 in head. Origin of anal is under third ray of dorsal, its longest ray 3.50 in head. Origin of anal is slightly nearer the origin of ventrals than to end of last caudal vertebra. Origin of the ventrals is midway between end of last caudal vertebra and angle of preopercle. Caudal forked, upper lobe scarcely equal to head, lower lobe considerably longer.

Color in life greenish above, silvery and white below, a distinct silvery band on side, bordered above by a narrow greenish band, fins white, the dorsal, anal, and caudal distinctly tipped with jet black.

Color in alcohol dull yellowish, green above, margins of scales darker. Sides with silvery bands which have a bluish green upper margin, yellowish white below. Cheeks silvery; tip of under jaw, snout and top of head more or less dusky; eyes golden, with dusky blotch above; dorsal, caudal, and anal yellowish, broadly tipped with jet black; pectorals and ventrals yellowish, a black spot on upper base and axil of pectorals.

Fourteen specimens, type is No. 5301 from Paawacan, Palawan Island, P. I., 14 August, 1908. Length, 145 millimeters.

Family ATHERINIDÆ. Silversides.

Atherina regina Seale, sp. nov. Plate III, fig. 1. (Gunoc.)

Head 3.50; depth 4.95; dorsal VI–I, 10; anal I, 10; scales 36, counting from the enlarged scale directly above axil of pectoral, 7 in vertical series; eye 2.25 in head; snout 4; interorbital space 2.75, being less than eye; maxillary 2.50; mandible 2; pectoral 1.25; ventrals 1.60; depth of caudal peduncle 3.45.

Body elongate, moderately compressed, greatest depth at origin of ventral fins. Caudal peduncle compressed, its least depth equal to twice its length.

Head heavy and rather blunt, its greatest width equal to its greatest depth, the lower portion of head strongly compressed. Interorbital space is slightly concave, caused by the prominence of the superocular ridges, these bones form distinct ridges on upper lateral part of snout. Top of snout flat except the small hump anteriorly caused by the processes of the maxillary, the anterior margin of the snout is an even concave curve, with a point on each side of processes; width of snout considerably greater than its length. Eye large; mouth large, oblique, the lower jaw slightly protruding. Maxillary narrow, ending on a line with the front margin of iris. Mandible ending under anterior third of pupil.

Preorbital with two or more distinct pores. Teeth in villiform bands in jaws, a small patch of villiform teeth on vomer, back of tongue, and pterygoids; the type specimen has the vomer broken but the two cotypes show teeth on the vomer; no teeth on palatine. Gill openings wide. Gill rakers long and slender, twenty-five or more on lower arch. Pseudobranchia large.

Scales large and smooth, their margins rounded and scarcely broken, the scaling not extending on the head except on the occiput, no scales on the fins except on base of caudal, but there is a distinct sheath of scales for the soft dorsal and anal. Top and sides of head well furnished with pores. A very large one just above opercles. There are sixteen scales in front of dorsal fin, ten scales between the origin of the two dorsals, and six scales along the base of the soft dorsal.

The origin of the spinous dorsal is midway between end of caudal vertebra and the anterior margin of eye, its longest spine is equal to orbit, the spines are slender and pungent. Soft dorsal on a line with origin of anal, and much nearer tip of ventrals, or to spinous dorsal, than to caudal; the second ray is longest being 1.85 in head; anal rays similar to soft dorsal, the longest being 2 in head. Origin of ventrals midway between end of maxillary and origin of anal. The anal pore is located between the posterior third of the ventral fins. Caudal rather large and deeply emarginate, the lower lobe being at least 1.40 in head. Pectorals are above the median line of body.

Color in alcohol is straw-yellow all the scales on upper half of body more or less punctulate with fine black or bluish dots. These black dots very thick on the middle of the three rows of scales on the back forming a median dark line on its either side. A distinct silvery band occupies the entire median row of scales on the side, the upper margin of this band is of a dull lead color, a double row of small black dots separating the two colors; there is an additional row of very minute black dots on the row of scales below the silvery stripe. The lower third of body is unmarked. Snout and rim of lower jaw washed with dusky, a distinct dusky spot at upper anterior margin of opercle directly behind eye, a dusky spot at upper axil of pectorals and a dusky bar across its inner base; a dusky area just over and impinging on eye. Dorsal, anal, and ventral fins uniform yellowish white. Pectoral with a distinct dusky blotch occupying an area slightly greater than eye at the beginning of the posterior third of fin; the tip of pectorals and the basal third of most of the rays white. Caudal slightly washed with dusky, two more or less distinct dusky blotches on its base.

The type is No. 2082, in the collection of the section of fisheries, Bureau of Science, Manila. It was secured by the writer at Culion Island, P. I., 7 October, 1907. Length of type, 80 millimeters. Two additional specimens No. 2083 were secured the following day at the neighboring island of Busuanga.

This species is related to *A. pinguis* Lacépède, which is no doubt the *A. lacunosa* Forster from which it differs in the fewer scales, location of fins, size of eye and absence of teeth on the palatines.

It somewhat resembles *A. morrisi* Jordan & Starks but their fish has 14 anal rays and scales 45 and the origin of the anal is in advance of the soft dorsal.

A. tsuruga Jordan & Snyder is a long panetela-shaped fish whose chief resemblance to the present species consists in its dusky spot on the pectorals; in other respects it is quite different. *A. lacunosa* Bleeker has no black spot on pectorals. *A. insila* Jordan & Seale has a large number of scales and is a quite differently shaped fish. I have compared this type with all of the above species now in the Stanford University museum and find it quite distinct.

Atherina balabacensis Seale, sp. nov. Plate III, fig. 2. (Gunoc.)

Head 3.75; depth 4.10; dorsal VI–I, 10; anal I, 12; scales 36; six in vertical series; eye 2.10 in head; snout 5; interorbital space 2.50, being less than eye; maxillary 2.50; mandible 2; pectorals 1.10; ventrals 1.80; depth of caudal peduncle 3.

Body elongate, moderately compressed, rather heavy and deep, its greatest depth at origin of spinous dorsal; the back is slightly but evenly curved; caudal peduncle compressed, its least depth 1.50 in its length, measured from end of caudal vertebra to posterior axil of anal.

Head rather heavy and deep, its depth being considerably greater than its greatest width, the lower profile of head is an even rounded curve while the upper profile from the occiput is almost straight. The lower jaw is the longest, forming the anterior point of head. The interorbital space is almost flat and has three short low ridges. Width of snout equal to its depth at its median point. Top of snout flat except for the small hump caused by the processes of the maxillary. Mouth large, oblique, the lower jaw protruding. Maxillary narrow, ending on a line with anterior margin of orbit. Mandible ending under the anterior margin of pupil. Preorbital with about four large pores or mucous cavities which give this bone a sculptured appearance. Villiform teeth in jaws, vomer, pterygoids, and back of tongue; no teeth on palatine. Gill openings large and carried forward to below anterior margin of iris. Gill rakers long, slender, and numerous. Pseudobranchia large, longer than the longest gill filaments. Isthmus long and narrow, a distinct groove on its lower surface.

Scales large and smooth, their margins not rough nor denticulate. Head without scales, fins unscaled, but with a scaly sheath to the soft dorsal and anal. Head is well furnished with numerous pores and canals. Fifteen scales in front of dorsal fin; nine scales between the margin of the two dorsals, and six scales along the base of the soft dorsal.

The origin of the spinous dorsal is midway between end of caudal

vertebra and the posterior margin of pupil, its longest spine is equal to orbit, the spines are slender and pungent. Origin of soft dorsal on a line with the origin of the fourth ray of anal, and much nearer spinous dorsal and tip of ventrals than to base of caudal, the second ray is longest being 1.80 in head. Anal similar to soft dorsal, its longest ray 1.50 in head. Origin of ventrals midway between origin of anal and a line with anterior margin of pupil. Anal pore between and at beginning of posterior half of ventrals. Caudal deeply emarginate, its lower lobe at least 1.20 in head. Pectorals are above the median line of body.

Color in alcohol straw-yellow, a slight greenish wash above. The scales above lateral line with fine dark punctulations. A dusky line along the middle of back from head to caudal, some darker shadings at the origin of the two dorsal fins, a dusky line from origin of anal fin to caudal. A bright silvery stripe occupies the middle third of the median line of scales, a narrow lead-colored margin along the upper margin of this silvery stripe, the row of scales below this silvery stripe has a row of very small black dots along its middle, there is also an indistinct incomplete row of dots on the next row of scales below. Base of pectorals with a dusky band and dusky spot in axil. A dusky blotch on upper part of eye. Lower jaw, top of head, and snout, shaded with dusky. No dusky spot on pectoral rays. Fins all grayish white, the caudal with a slight dusky wash, but without dusky spots at base.

The type is No. 4983 from Balabac Island, P. I. Taken by the writer 1 August, 1908, near the mouth of a small stream. Length of type, 10 millimeters. Eight cotypes were secured from the same locality, Nos. 4983, 5308 and 5229. Additional specimens of this species were secured from the following places: 1241 Samar Island, 1295 Cebu, Cebu Island, 1370 Siquijor Island, 1447, 1457, 1495, 1658 and 1659 Cagayan, Mindanao Island, 1981 and 5475 Puerto Princesa, Palawan Island, 2079 Culion Island, 4866 Samal Island, Mindanao. Thirty-two specimens in all including types.

This species but slightly resembles *A. forskalii* (Rupp.) being a deeper, heavier fish with a caudal peduncle not nearly so deep and has fewer scales and anal rays. Evermann and Seale[3] refer specimens from Bacon and Bulan to *A. forskalii* which probably belong to this species. This species somewhat resembles *A. duodecimalis* Bleek., but the shape and color markings are different, the rows of black dots on the sides being always present in our specimens. This species somewhat resembles *A. lineata* Gunther but the latter species has teeth on the palatines, a smaller eye, and different location of fins. *A. lineata* also has the pectoral slightly washed with dusky over its entire surface and the rows of dots are larger and more distinct.

[3] *Bull. Bur. Fish.* (1906).

Family MUGILIDÆ. The Mullets.

Mugil joloensis Seale, sp. nov. Plate IV.[4] (Banak.)

Head 4.30; depth 3.60; dorsal IV, I, 7; anal I, 9; scales 33, 10 in vertical series; eye 3.30 in head; snout 4.10; interorbital space 1.95; maxillary exposed at tip; mandible 2.75; pectorals equal to head; ventrals 1.30; least depth of caudal peduncle 2.

Body moderately elongate, compressed, the greatest depth being in middle of body, the depth of the caudal peduncle is scarcely less than its length (measured to axil of dorsal). The profile from origin of spinous dorsal to snout is almost a straight line.

Interorbital space is moderately convex. Top of snout almost flat. Greatest width of head 1.45 in its depth. Depth of head at middle of eye 1.75 in length. Snout short and blunt. The preorbital has a very deep notch, its depth being greater than width of pupil. The upper lip is very thick, with a fold, and fringed with a row of papillæ, an additional row of pipillæ on the lip just above the fold, an additional fringed fold at each corner of the mouth; under lip with moderately broad membrane. The nostrils are situated directly above the posterior margin of preorbital notch. Teeth on tongue, vomer, and palatine, none in jaws. Eye with but the slightest indication of adipose eyelid, which is present as a narrow rim to orbit. Snout is much broader than long, it is fully tipped by the broad maxillary. There are four soft differentiated areas between the scales on preopercle. Gill openings large being carried forward to under pupil. Gill rakers numerous slender, longest about equal to pupil. Pseudobranchia present.

Body and head covered with large smooth scales which are slightly ctenoid at margin. A single small ridge in center of each scale. About nineteen scales in front of dorsal fin; soft dorsal and anal scaled. Pectorals without axillary scale. An axillary scale at ventrals. Eleven rows of scales between the origin of the dorsals.

The spinous dorsal is midway between end of caudal vertebra and middle of pupil, the longest spine 1.70 in head. Origin of soft dorsal midway between end of last caudal vertebra and origin of first dorsal being over the middle of anal, its longest ray equal to longest anal ray, 1.50 in head. Origin of anal is slightly nearer end of caudal vertebra than to origin of ventrals. The ventrals are midway between anal and anterior margin of orbit. The upper portion of pectoral base is on a line with upper margin of eye. Caudal fin is rather deeply emarginate its length greater than head.

Color in alcohol silvery with wash of yellowish, grayish above. Upper third of pectorals washed with dusky; soft dorsal, anterior rays of anal, and tip of caudal also slightly washed with dusky. No stripes on body,

[4] In our figure the spinous dorsal and the ventrals are drawn too far forward.

except those caused by the small ridge along center of scales. A distinct black dot at axil of pectorals.

Type is No. 2379. Secured by the writer at Jolo, Jolo Island, P. I., February, 1908. Length, 125 millimeters.

This species is related to *M. labiosus* C. & V., but *M. labiosus* has "upper lip without fringe." Our species has fewer scales, and the upper third of dorsals dusky, our species has teeth on vomer and palatine.

Mugil banksi Seale, sp. nov. Plate V. (Banak.)

Head 4.50; depth 3.50; dorsal IV, 9; anal III, 9; scales 37, 10 in vertical series; eye 3.10 in head, the exposed portion 4; snout 5; interorbital space 2; maxillary is entirely hidden; mandible 9 in head; preorbital with shallow notch, its end but slightly denticulate, its width at end 1.30 in pupil; pectorals equal to head; ventrals 1.30.

Body moderately elongate and compressed, the upper and lower outlines being about evenly curved to the short blunt snout. Tip of head formed by the deep upper lip. Caudal peduncle is thick and strong, its depth 1.25 in its length measured to vertical dorsal axil.

The head from the blunt snout is rounded conical; interorbital space convex. Eye is large with the adipose lid developed as a narrow fringe to orbit and not covering more than a third of the iris before and behind. Greatest width of head 1.45 in its length being almost equal to its greatest depth, width of snout is equal to twice its length and is much more than its depth. An elongate shallow depression on upper sides of snout containing the two nostrils, the posterior one much the larger. Upper lip thick, with two distinct rows of papillæ, these becoming united into little folds near the corners of the mouth. Lower lip thin, without papillæ. No teeth in jaws or mouth. Gill openings extend forward to below posterior margin of pupil. Gill rakers are short slender and numerous. The two margins of the subopercles fitting closely below, the space between them being confined to a short narrow line anteriorly. The mandibles cover the entire chin.

Head and body including soft fins scaled. The scales of body large, smooth, thin, margined with a thin soft membrane. A short narrow groove in the center of each scale, about 20 scales in front of dorsal fin and 13 series between the origins of the two dorsals. A distinct axillary scale at pectoral and ventral. Anal with scaly sheath. Five soft differentiated areas on the margin of the preopercle between the marginal scales.

Origin of spinous dorsal midway between tip of snout and end of last caudal vertebra, length of first spine 1.50 in head; origin of soft dorsal very little nearer origin of spinous dorsal than to end of caudal vertebra, being on a line with the third anal ray, its longest ray 1.30 in head. Origin of anal slightly nearer end of caudal vertebra than to axil of ventrals. The longest ray equal to longest ray of soft dorsal, base of

fin 1.70 in head. Origin of ventrals midway between origin of anal and notch of preorbital, caudal deeply emarginate, its length considerably greater than head.

Color in life silvery with a grayish wash above. The head with bronzy reflections. A distinct black spot at upper axil of pectorals and a rather broad and distinct white bar across the base of the fin below the dark spot. A white margin to anal pore. Fins whitish, soft dorsal and caudal slightly washed with dusky on posterior third.

Color in alcohol similar to above, but the groove on middle of scale showing more distinctly above and giving the appearance of narrow stripes on center of rows of scales.

Type is No. 1412. Secured at Siquijor Island, P. I., 7 September, 1908. Length, 190 millimeters.

This species is related to *M. longimanus* but is distinguished by the fringed lip, 9 anal rays, and smaller adipose eyelid, markings, and position of fins.

Named for C. S. Banks, entomologist Biological Laboratory, Bureau of Science, Manila.

Family SPHYRÆNIDÆ. The Barracudas.

Sphyræna aureoflammea Seale, sp. nov. (Babayo.)

Head 3.10; depth 6.35; dorsal V, 10; anal 11; scales 7–83–9 (counting to end of caudal vertebra); eye 5 in head (measured to tip of upper jaw); snout 2.25; interorbital space 1.75 in eye; maxillary 2.75 in head; mandible 1.75; ventrals 3.10; pectorals 2.75.

Body elongate, cylindrical, the upper and lower outline about evenly curved, length of caudal peduncle 1.50 in head, its least depth 3 in its length.

The head is elongate, conical, its greatest depth 2.75 in its length, greatest width 3. Upper profile of head is almost straight; the interorbital space is flat, with 4 distinct ridges. The opercle ends in a single obtuse flat point. The lower angle of preopercle extends back as a large membraneous flap. The eyes are of moderate size. Snout is conical, its median width being somewhat greater than its median depth. Preorbital with a distinct oblique ridge in front of the eye. Maxillary falls short of the eye by a distance equal to pupil, the maxillary ends in a small but distinct spine. The lower jaw considerably the longer. Teeth of upper jaw consist of a single row of small teeth on sides of palatines with three enlarged canines a short distance from tip of jaw, and two enlarged canines on each side at tip of jaw, the maxillary also has a single row of small teeth. Teeth of lower jaw a single series of rather strong canines. A single large canine at symphysis. No teeth on vomer. Gill openings large, ending on a line with anterior margin of eye. Two gill rakers on lower limb, one being at the angle, these are distinct, sharp, pointed, their length 2 in pupil.

Body entirely covered with large smooth scales, about 23 in front of dorsal, and 31 between the origins of the two dorsals. The fins, except spinous dorsal, are more or less scaled. Head is naked except on nape, cheeks, and opercles; lower limb of preopercle naked, no scales on head in front of anterior margin of pupil.

Origin of spinous dorsal midway between origin of second dorsal and posterior margin of pupil, being above the middle of the ventral rays, the anterior spines longest, being equal to postocular portion of head. Origin of second dorsal considerably nearer the first dorsal than to end of caudal vertebra. Origin of anal is under the second dorsal ray and is slightly nearer end of caudal vertebra than to orgin of ventrals. Base of soft dorsal slightly greater than base of anal which is 3.75 in head. The longest dorsal ray and longest anal ray about equal, 3.10 in head. Origins of ventrals midway between middle of maxillary and anal fin. Caudal deeply emarginate, the lobes 2 in head.

Color in life, above lateral line lemon-yellow, a purplish stripe from snout over interorbital space and nuchal region to near base of second dorsal, a short stripe with some yellow edgings in front of eye. A brown stripe from origin of lateral line to middle of base of caudal, another line from posterior margin of eye over base of pectorals to caudal, the area between these two lines rather a bright blue, ventral surface a pale blue. Some greenish scales with yellow margins on nuchal region, lips brown, soft dorsal with slight wash of brown, caudal yellowish brown, anal with a slight trace of pink, other fins white.

Color in alcohol dull brownish above, silvery below; two brown lines on sides; top of head and snout darker; soft dorsal and caudal grayish, pectoral more or less grayish at axil.

Five specimens. Type is No. 4138, from Zamboanga, Mindanao, 22 May, 1908. Length, 280 millimeters.

Family SYNGNATHIDÆ.

Trachyrhamphus caba[5] Seale, sp. nov.

Head 4 in body (measured from tip of snout to anal opening); greatest depth equal to postocular portion of head; dorsal 22, its base occupying 4 rings which are swollen, thus the base of the fin is considerably elevated above the level of the dorsal surface; body with 18 rings, tail with 33 rings. The dorsal is located on two of the tail rings and two of the body rings; anal 4; snout equal to distance from pupil of eye to posterior margin of opercle; eye 4 in head; interorbital equal to eye; pectorals 1.75 in snout; caudal 1.50 in snout, its tip rounded; length of body and head equal to 21 rings of caudal; lateral line passes to lower caudal edge which is strongly scalloped; nuchal region has a decided crest; snout strongly depressed, being in line with lower margin of body,

[5] *Caba* is the native name for this fish.

the forehead has an abrupt curve, formed by the pronounced ocular ridges; interorbital space deeply concave; opercles with numerous fin-shaped striæ, which radiate from a single larger longitudinal ridge; ten distinct ridges in the interorbital space which unite and form one on the snout, this ridge has a few small spines; the orbital ridge is also spinate; rings of body and tail without spines; length of dorsal rays less than width of opercle.

Color brown, the three anterior caudal rings lighter, the ventral surface of body rings and opercles brown, with the yellow cross lines on their under surface, these cross lines not extending on body rings; snout brown above and white below. A brown ring near the tip, fins grayish without markings.

Type is No. 2324 from Balayan Bay, Luzon, 20 January, 1908. Length, 140 millimeters.

Family HOLOCENTRIDÆ. The Squirrel Fishes.

Myripristis schultzei Seale, sp. nov. (Baga baga.)

Head 3.10; depth 2.50; dorsal X, I, 15; anal III, 13; scales 28 to end of vertebra, 10 in vertical series; eye large, 2 in head; snout 7.50; interorbital space 3.30; maxillary 1.80, its posterior tip ending on a line with posterior margin of pupil, width of distal end 2 in eye; mandible 1.60 in head; pectorals 1.25; ventrals 1.45.

Body oblong, compressed, greatest width at origin of dorsal. Upper and lower outlines of body about equal. Length of caudal peduncle 2.50 in head, its depth 3.10. Depth of head about equal to its length, its greatest width 1.50 in its length; interorbital space flat with 4 longitudinal ridges. The anterior outline of head is bent rather abruptly down in front of eyes making a short blunt snout, the length of which is 2 in its width. The groove to receive the maxillary process ends on a line with anterior of eye. Preorbital is narrow and denticulate, its greatest width 3 in interorbital space; opercular bones are denticulate, the opercle has a single flat spine on its posterior margin, maxillary with small teeth on its lower posterior border. Mouth large, oblique, lower jaw slightly the longest. Four distinct pores on tip of lower jaw; bands of villiform teeth in jaws, vomer, palatin, and on hyoid portion of tongue. A few large exterior teeth on the outside of each jaw, more abundant and larger on lower jaw. Gill openings very large being carried forward to below anterior margin of pupil. Gill rakers rather long, about 30 on lower arch, the longest 2 in eye. Pseudobranchia present.

Scales are large and toothed; body fully scaled; head naked except about 3 rows of scales on cheeks; ventral with distinct axillary scale.

Origin of dorsal fin midway between tip of snout and third anal ray. Fourth spine the longest, 1.85 in head. Anal and soft dorsal similar,

the anal rays are slightly the longest, being 1.30 in head. Third dorsal spine is slightly the longest being 2.30 in head, both the soft dorsal and anal are sharp pointed.

Origin of ventrals midway between anal and anterior margin of eye, caudal forked, 1.10 in head.

Color in life pinkish, washed with violet above, the margins of scales on sides with brighter red, tip of lower jaw and snout red. Margin of spinous dorsal deep red, the body of fin pale red, anterior of soft dorsal and anal broadly margined with deep red. Tip of caudal deep red shading into lighter red at base. No opercular blotch, some deeper red on base of pectorals, inner axil of pectorals deep black.

Color in alcohol yellowish white with some bronzy reflections, darker above; fins uniform yellowish white; no opercular blotch; inner axil of pectorals deep black.

Type is No. 3899 taken at Samal Island, Gulf of Davao, P. I., 4 May, 1908. Length, 160 millimeters.

This species is related to *M. violescens*.

Family CARANGIDÆ. The Pampanos.

Caranx auriga Seale, sp. nov. Plate VI. (Talakitok.)

Head 3.30 in length; depth 2.75; dorsal VII, I, 17; anal II, I 16; 35 armed scutes constituting the straight portion of the lateral line, about 70 scales in curved portion of line, curved portion 1.35 in straight, greatest depth of curve 4.25 in head, the line becomes straight under the third dorsal ray; eye 3.50, the adipose eyelid covering the posterior third of eye and a narrow margin anteriorly; snout 4.20; interorbital space equal to eye; maxillary 2 in head, its end under posterior margin of iris; width of its distal end 1.50 in eye; ventral 2.10 in head; least depth of caudal peduncle 2.40 in eye, its width scarcely less than eye.

Body oblong, moderately compressed, the depth at the origin of spinous dorsal and at soft dorsal equal; the lower outline from the origin of anal rays to mandible is a straight line, the mandibles being placed at a very low angle. The upper outline from origin of soft dorsal to tip of snout is curved, the snout being at an angle much greater than 75°. The length of caudal peduncle (measured from upper origin of caudal rays to axil of dorsal) is but little more than its width, its depth is 2 in its length. Upper profile of head strongly rounded, a distinct ridge from occiput to nostrils, the snout is placed at a steep angle. Width of preorbital 1.60 in eye; greatest width of head 1.85 in its length; eye of moderate size, the adipose lid covering the posterior portion up to pupil, a very narrow anterior adipose lid. Lower jaw is slightly projecting, each jaw has rather wide membraneous lips; maxillary with strong supplemental bone. Each jaw with moderately strong curved canines, the upper jaw with an inner row of villiform teeth. Villiform teeth on vomer,

palatines, and tongue. Gill opening wide, being carried forward to a line with the anterior margin of eye; gill rakers rather strong and saber-like, 14 on lower limb, the longest about 1.50 in eye. Pseudobranchia present.

Scales small, rather smooth, breast fully scaled, head naked except on cheeks and nape. The scutes are graduated in size from middle of caudal peduncle, their greatest depth being slightly less than pupil, their size at beginning of straight portion of lateral line very minute.

Origin of spinous dorsal slightly posterior to axil of pectoral, the spines weak, the second spine the longest being 2.40 in head, the last dorsal spine is free. The soft dorsal and anal are quite similar the rays being of about equal length, the longest being 2 in head, base of anal slightly less than base of soft dorsal, the origin of the anal rays being under the fifth dorsal ray; the last anal ray is slightly prolonged. Anal spines are under origin of soft dorsal; ventrals are about midway between tip of snout and origin of anal rays; their tip reaching to anal pore. Pectorals long and falcate, their tip reaching to fifth anal ray. Caudal strongly forked, two narrow ridges on its base, one on each side of the scutes, length of fin slightly less than head.

Color in life silvery with bronze wash and golden reflections, soft dorsal, anal and caudal yellow, a rather large, not very dark and somewhat diffused opercular spot at origin of lateral line, a black spot on inner axil of pectoral not showing on outer surface.

Color in alcohol similar to above but dull silvery on upper half, yellowish white below. Head with bronze reflections, fins yellowish white, without dark markings except a slight trace of brownish on tip of spinous dorsal and on tip of upper half of caudal.

Type is No. 30. Secured at Manila, P. I., 21 May, 1907. Length, 230 millimeters.

Caranx butuanensis Seale, sp. nov. Plate VII.

Head 3.75; depth 2.50; dorsal VIII, I, 21; anal II, I, 17; scales small; 43 scutes in straight portion of lateral line, and about 70 scales in curved portion, the curved portion contained 1.50 in straight, the greatest depth of the curve about equal to eye. The lateral line becomes straight under the sixth dorsal ray; eye 3 in head; snout 4; interorbital space 3 in head; maxillary 2.1, ending slightly posterior to pupil, width of its distal end 1.50 in eye; mandible 1.85 in head; pectorals 3.30 in body; ventrals 1.85 in head; least depth of caudal peduncle 2 in eye. Body oblong compressed, its greatest depth at origin of soft dorsal, the lower outline from origin of anal rays to tip of lower jaw is a low even curve. The upper outline from origin of soft dorsal to tip of snout is an irregular curve being deeply concave at the occiput, causing the head to be of considerable less depth than in most species of the genus. Length of the caudal peduncle is about a fourth greater than its width. Upper profile of head with a ridge from origin of dorsal to nostril. The snout

is at an angle of a little more than 45°. Greatest depth of head slightly less than its length, its width 2 in length. Mouth is of moderate size, the lower jaw slightly the longest, distinct membranous lips on each jaw, a large supplemental bone on maxillary. Width of preorbital about 2 in eye. Teeth of lower jaw small, in two or more rows, with some large canines anteriorly. Teeth of lower jaw consisting of a single row of rather small canines, teeth on vomer, palatines, and tongue. Gill openings large, being carried forward to below anterior margin of eye. Gill rakers saber-like, 16 on lower limb, the longest about 1.50 in eye. Pseudobranchia present.

Scales are small, smooth, and fully cover the body, including breast. Head is naked except on cheeks and occiput. The scutes are graduated from the caudal peduncle, the deepest being 1.75 in eye, those at the beginning of straight portion of lateral line minute.

Origin of spinous dorsal slightly posterior to axil of pectoral, the third spine longest, 2.45 in head; the last dorsal spine free. Soft dorsal and anal similar, their longest rays being about equal, 1.85 in head, the last ray of each fin slightly prolonged.

Base of soft dorsal slightly the longest, the origin of anal being under the sixth dorsal ray. Anal spines are below origin of soft dorsal. Origin of ventrals midway between tip of snout and origin of first anal ray. Pectorals falcate, their tip scarcely reaching to anal rays. Caudal forked with the two ridges on base almost obsolete, length of fin slightly less than head.

Color in life silvery below, with about 7 wide dusky bands over the back and down on sides, these bands of much greater width than the interspaces, bands of equal width. Fins yellowish white, except spinous dorsal which has a slight wash of grayish. A dusky opercular spot.

Color in alcohol silvery with slight bronzy reflections, 7 dusky bands on back, the first being on nuchal region and the last on caudal peduncle. A dusky opercular spot. Top of head with some grayish, fins yellowish white except spinous dorsal, which has a slight wash of gray, there is also a very slight trace of grayish on tip of soft dorsal. Inner axil of pectorals dusky, no dusky on their base. Iris golden with dusky blotch on upper margin.

Type is No. 1896, taken at Butuan Bay, Mindanao Island, P. I., 25 September, 1907. Length, 120 millimeters.

Family APOGONICHTHYIDÆ.

Amia magnifica Seale, sp. nov. (Daugat.)

Head 2.75; depth 3; dorsal VI, I, 8; anal II, 7; scales 24, lateral line complete; 7 scales in vertical series; eye 2.75 in head; snout 3.50; interorbital 1.50 in eye; preopercle distinctly denticulate; bands of villiform teeth in jaws, vomer, and palatines.

Body oblong, compressed, the greatest depth at origin of dorsal; caudal peduncle rather long and slender, its depth 2.50 in head, its length 1.45. Upper outline of body more strongly curved than lower. Head pointed, mouth large, lower jaw projecting; eye large, interorbital space slightly convex with two ridges, which unite into one midway between eyes. Tip of maxillary extends to a line with pupil, its distal margin concave, its length 2.10 in head.

Gill openings large, extending forward to below pupil. Gill rakers rather slender not very pointed, about 19 on lower limb.

Body covered with large smooth scales, cheeks and opercles scaled.

Origin of dorsal midway between middle of caudal peduncle and tip of of snout, its second spine the longest, 1.80 in head, last dorsal spine almost as long as first ray, the longest ray 2.70 in head; caudal slightly lunate. Origin of ventrals midway between base of caudal and pupil, its second spine about two-thirds length of rays, its longest ray 1.75. Origin of ventrals midway between anal and a line with nostril, their tip reaching almost to anal, their length 1.50 in head. Pectorals 1.75 in head.

Color in life. A bright cardinal red with five silvery longitudinal lines, the middle one being composed of round silvery spots. These lines are arranged as follows: the first is from tip of snout through upper part of eye back to below anterior third of dorsal where it unites with the second line, the portion of this line on the snout is orange, the remainder is silvery; the second line is from posterior of eye to caudal, the portion on the opercle is margined above and below with dusky; the third line is from the lower posterior portion of eye to caudal, this line on the opercle is also margined with dusky, and posterior to opercle it is composed of round silvery dots; the fourth line is from maxillary below eye to lower margin of opercle, this line is margined with dusky; the fourth line extends from the lower posterior portion of opercle to the caudal; the fifth line is below this and forms the general white coloring of the belly, to anal fin. The fins are all uniformly red. Top of head with orange stripe from interorbital space along base of dorsals; chin orange, tip of jaws brownish.

Color in spirits. The bright cardinal fades into dull brownish, the silver becomes pale yellow, the orange fades into dull yellow, the opercles show a beautiful, opalescent bluish reflection, the black on tip of jaw and a black line on snout fade into white; the dusky margins to the stripes on head show more distinctly, the lines on interorbital being bluish white ending on nuchal region. A slight black area on middle of caudal base, fins yellowish white.

Numerous specimens. Type is No. 5192, from Balabac Island, 10 August, 1908. Length, 40 millimeters.

Amia cardinalis Seale, sp. nov.

Head 3; depth 2.75; dorsal VI, I, 9; anal II, 8; scales 24, the lateral line complete, 7½ scales in vertical series; eye 2.75 in head; snout 4; interorbital 1.50 in eye; maxillary 2 in head, its distal end on a line with posterior margin of iris; mandible 1.55; posterior margin of preopercle strongly denticulate.

Teeth in villiform bands in jaws, vomer and palatines.

Body oblong, compressed, the greatest depth at origin of dorsal, caudal peduncle rather long and thin, its depth equal to orbit, its length 1.20 in head. Upper outline of body more strongly curved than lower. Head rather bluntly pointed, mouth large, cheeks and opercles each with two rows of scales, opercle with a sharp flat spine. Gill openings wide, being carried forward to a line with the pupil. Gill rakers short and sharp pointed, about 13 on lower limb. Body fully covered with large smooth scales which have very finely toothed borders, head without scales except on cheeks and opercles.

Origin of dorsal fin is midway between tip of snout and middle of caudal peduncle, its second spine is the longest and strongest, its length 1.50 in head. The last dorsal spine scarcely more than half the length of the first ray which is 1.75 in head. Caudal slightly bilobed, 1.25 in head; origin of anal midway between end of last caudal vertebra and distal end of maxillary, its longest spine about equal to orbit, its longest ray 1.75 in head. Origin of ventrals midway between anal and a line with middle of pupil, their length 1.50 in head; pectorals 1.40 in head.

Color in life uniform bright cardinal, without stripes or bands; a slight tint of yellow on side of belly, and a brownish blotch on opercles just posterior to eye, fins all uniform red.

Color in alcohol uniform yellowish white, some dusky marks at base of dorsals. A slight opalescent tint on opercle. A brown spot on nuchal region, fins uniform yellowish white.

Type is No. 5463 from Puerto Princesa, Palawan Island, P. I., 21 August, 1908. Length, 40 millimeters.

This species seems to differ in several respect from *A. erythermus* to which it is most nearly related.

Family SERRANIDÆ.

Epinephelus albimuculatus Seale, sp. nov. Plate VIII. (Lapo lapo.)

Head 2.65 (measured from tip of jaw to tip of opercular flap); depth 3.35; dorsal XI, 16; anal III, 8; scales about 120 in lateral series, 50 in vertical series, about 50 pores in lateral line; eye 5.80 in head; snout 4.45; interorbital 7.10; maxillary 2.14, extending posterior to eye; mandible 1.80.

Body oblong, compressed, rather slender and elongate for this genus,

the upper outline considerably more curved than lower. Least depth of caudal peduncle 3.30 in head, caudal truncate.

Anterior profile from origin of dorsal to tip of snout has a gradual even curve. Lower jaw rather strongly projecting. Mouth large. Each lip with a fold. Upper jaw without teeth directly in center of jaw, but with a patch of small sharp teeth on each side of symphysis. A single, small projecting canine on each side; extending back on the jaws from each anterior patch are several rows of villiform teeth with an outer row of enlarged canines. Under jaw with bands of cardiform teeth anteriorly with a projecting canine on each side (broken in type) the side of lower jaw with two rows of enlarged teeth, the anterior row of larger depressible teeth. Bands of villiform teeth on vomer and palatine. Tongue spatulate, without teeth; preopercle rounded and finely toothed, a slight notch near its angle below which the teeth are slightly enlarged. Soft portion of opercle ending in a single sharp point, the hard portion of opercle with three spines the middle one being much the largest in fact the only conspicuous one, the upper one being obtuse and hidden, and the lower one very small, the middle spine is the most posterior and its tip is nearer tip of lower than to upper spine. Gill openings large, being carried forward to below anterior portion of eye. Gill rakers large and strong, 16 on lower limb, the longest equal to two-thirds diameter of eye. Scales are minute and ctenoid; body, head, and fins, except jaws and posterior portion of maxillary, finely scaled; the scales on under surface and on nuchal region smallest.

Origin of dorsal midway between tip of snout and third ray of dorsal, the third to fourth spine longest, 2.40 in head, the first spine 1.90 in second, the longest ray 2.75. Origin of anal slightly nearer to last caudal vertebra than to angle of preopercle, its third spine the longest, 3.75 in head, its longest ray 2.10 in head. Ventrals 2 in head, their origin midway between anal and a vertical line with posterior nostril. Pectorals 1.75 in head.

Color in life brownish with tint of green, about 30 rather large scattered round yellow spots on head, fins slightly darker, otherwise color uniform.

Color in alcohol. Uniform brown with scattered round whitish spots on head, about 30 on each side and 4 or 5 showing indistinctly on shoulders, above lateral line, fins dark brown, uniform, the pectorals a shade less dusky.

Type is No. 1908 from Butuan Bay, Mindanao, P. I., 26 September, 1908. Length, 280 millimeters.

This species is related to *E. coromandelicus* Day but differs in several respects, being more elongate and having a longer maxillary, a slightly different arrangement of opercular spines, and a different color pattern.

Family HÆMULIDÆ.

Plectorhynchus doanei Seale, sp. nov.

Head 3; depth 2.40; dorsal XI, 20; anal III, 8; scales about 75; 64 pores in lateral line; about 30 scales in vertical series; eye 3; snout 3; interorbital space 4; maxillary 3.75, scarcely reaching to anterior margin of eye; mandible 2.75.

Body is oblong, compressed, the upper outline with much stronger curve than lower, the greatest depth is at origin of ventrals. Depth of caudal peduncle 2.75 in head, its length 1.80.

The anterior profile from origin of dorsal to end of snout is a strong curve, the snout however is almost straight and at an angle of more than 45°. Mouth small, lips thick, with fold. Teeth of upper jaw mostly anterior in several rows, small, sharp pointed. Teeth of lower jaw similar, except that those on sides of jaws are in single series. No teeth on vomer or palatine. Posterior margin of preopercle rather strongly denticulate. A rather deep notch on posterior margin of opercle. Gill openings wide, being carried forward to below anterior margin of eye. Gill rakers short, fine, almost hair-like, 26 on lower limb. Pseudobranchia present. Entire body and head, including also bases of all the soft fins covered with fine ctenoid scales. Origin of dorsal midway between tip of snout and base of sixth dorsal ray. The third or fourth spine longest, 1.75 in head, the eighth, ninth and tenth spines are shorter than the first spine, being less than length of snout. Longest dorsal ray 1.35 in head. Origin of anal midway between end of last caudal vertebra and the middle of base of pectorals, its base 2.50 in head, its second spine is much the longest and strongest, its length 1.75 in head, the longest ray 1.40 in head. Caudal forked, 1.1 in head, its lobes rounded; ventrals nearer to angle of mouth than to anal, their length 1.10 in head; pectorals equal to head.

Color in life orange red with about 7 large white areas margined with black, the anterior one occupies the snout, the second the nuchal region, extending down to opercles on each side but not to base of dorsal, the third occupies a region from origin of gill openings to, and including base of ventrals and obliquely up to eye, there is a square red band in the middle of this area across the thorax. There is a dark ocular band about width of eye down from eye around base of lower jaw, the fourth white area is a round spot back of, and above, base of pectorals, the fifth is below seventh to ninth dorsal spines and includes these spines, the sixth just above and includes the origin of anal, the seventh is an oblique white ring occupying the outer two-thirds of caudal peduncle. The posterior two-thirds of caudal is white with an oblong dusky patch on each lobe, the sixth and seventh white areas have an indistinct round dusky spot in the center. The soft dorsal is dusky with margins of

rays white and a white spot near middle of fin. Anal is dusky at base, broadly margined with white, with some dusky blotches at tip. Ventrals black, with a white spot on anterior ray. Pectorals black with white tips.

Color in alcohol similar to above, except that the orange fades into a light brown, the black margins to the white areas remain very distinct.

Type is No. 4760 from Sitanki Island, Jolo Archipelago, 15 July, 1908; length, 40 millimeters; also a specimen No. 1695 from Cagayan, Mindanao.

Family THERAPONIDÆ. The Grunts.

Dentex filiformis Seale, sp. nov. Plate IX.

Head 3.75; depth 4.15; dorsal X, 9; anal III, 7; scales 3–47–16; eye 3 in head; snout 3.10; interorbital space equal to eye; maxillary 3; mandible 2.35; pectorals 1.25 in head; ventrals 1.30; depth of caudal peduncle 3.

Body moderately elongate, oblong, compressed, of about equal depth at origin of pectorals and at anal pore; least depth of caudal peduncle 3 in head.

Head somewhat conical, the profile from nape to snout evenly curved, the interorbital space is moderately convex. Greatest width of head 1.85 in its length. Snout rounded, its width at anterior nostril equal to its length; jaws equal, the upper moderately protractile, each jaw with a rather wide fold or lip. Maxillary fully hidden except at its tip, premaxillary scarcely reaching to eye, preorbital notched at angle of jaw, its width at this point equal to pupil, no spine on its posterior margin. Lower jaw with two distinct pores on each side, mouth wide, slightly oblique. Curved canines in each jaw, with patches of inner villiform teeth anteriorly, the fourth anterior canine of upper jaw largest. No teeth on vomer, palatine, or tongue. Preopercle fully serrated, opercle with a single rather distinct spine; five rows of large scales on cheeks. Head, except snout, preorbital, and under jaw, fully scaled. Gill opening wide, being carried forward to a line with middle of eye. Gill rakers consisting of short, thick asperites, about 4 on lower limb. Pseudobranchia present. Eyes quite large.

Scales small and ctenoid, the rows running horizontally on upper third of fish and obliquely below, body fully scaled; five distinct rows of scales on cheeks with the addition of a few scattered scales at margin of orbit.

Dorsal fin continuous, the spines weak, the fourth and fifth spines the longest, 2.50 in head, the longest ray 1.95 in head, the fin is provided with a distinct groove into which it fits, its origin is directly above the axil of pectoral. Origin of anal on a line with base of second dorsal ray and is midway between end of caudal vertebra and origin of ventrals, the anal spines are graduated, the third being 3.75 in head, longest ray 2.75, base of fin 1.90 in head. Origin of ventrals slightly nearer tip of

snout than origin of anal, its length 1.30 in head. Pectorals 1.30 in head, caudal forked with the outer rays of upper lobe filliform, its length 2.35 of body, the lower lobe 1.30 in head.

Color in alcohol yellowish, a wide brown band slightly less than width of eye, occupies the middle of sides from eye to caudal. A yellowish area above this band, the entire upper portion brown, a round dusky dot at posterior end of lateral line, snout dark brown. There is a slight indication of an additional but very indistinct dusky band on upper sides of belly fading out posteriorly. Fins all uniform, yellowish white without markings.

Type is No. 1755 from Surigao, Mindanao, P. I. taken 17 September, 1907. Length, 130 millimeters.

Family LUTIANIDÆ. The Snappers.

Lutianus orientalis Seale, sp. nov. (Mayamaya.)

Head 2.75; depth 2.80; dorsal X, 14; anal III, 8; scales 8–51–14; eye 3.75; snout 3.10; interorbital 5.25; maxillary 2.30, ending under anterior third of pupil; mandible 1.75 ending on a line with posterior margin of pupil; pectorals 1.30; ventrals 1.55. .

Body oblong, compressed, the greatest depth at origin of spinous dorsal. The upper outline from axil of dorsal to eye is an even curve; outline of head at eyes slightly concave. The lower profile from anal to chin is almost straight, the lower jaw being at a low angle. The length of the caudal peduncle is 1.80 in head, its greatest depth 1.25 in its length. Interorbital space slightly convex, a median ridge along its center; snout conical; width of preorbital but slightly greater than pupil. Jaws equal. Teeth consisting of villiform bands with outer row of curved canines, and a very long and strong anterior canine on each side of upper jaw. Teeth on vomer and palatine, none on tongue. A very shallow preopercular notch, no opercular knob, opercle ending in a flat spine. Gill openings wide, ending under anterior margin of eye. Gill rakers of moderate length, sharp-pointed, ten on lower limb, the longest about equal to pupil. Pseudobranchia present. Body fully scaled, cheeks, nape and opercles scaled, soft dorsal, caudal, anal and pectoral scaled at base.

Origin of dorsal above axil of pectoral, the fourth spine the longest, 2.50 in length; longest dorsal ray 2.30 in head; second anal spine slightly the longest, 2.75 in head; longest anal ray 2.10 in head. Origin of anal under second dorsal ray; origin of ventrals, midway between tip of snout and fourth anal ray, their spine only about half length of rays. Pectorals not reaching to anal. Ventrals extend to anal pore. Caudal scarcely emarginate, its length 1.35 in head.

Color in life yellow, darker above, four wide black longitudinal stripes of almost the width of pupil at their median point, the first from snout

through interorbital space to posterior base of spinous dorsal. Second from posterior margin of eye to base of soft dorsal. Third from tip of snout through eye to upper base of caudal, a large black ovate spot in this line and extending above it, below the anterior portion of soft dorsal. Fourth from suborbital to lower base of caudal through the upper axil of pectoral, there is a slight dusky wash on tips of spinous dorsal and caudal, otherwise fins yellowish white.

Color in alcohol similar to above except the lines on top of head do not show, and the general color is dull yellowish white, brownish above with the black lines and black blotch showing very distinctly.

Four specimens; type is No. 2201 from Limbones Cove, Island of Luzon, P. I. Length, 95 millimeters, 14 January, 1908. The three additional specimens are from Balabac Island, P. I.

This fish was called *L. russeli* by Jordan & Seale and *L. quinquilineatus* by Jordan & Richardson. Day gives it as the young of *L. chrysotænia,* but we have specimens of *chrysotænia* and there is no doubt of it being a different fish. I have examined specimens of the two former species in the Stanford University Collection and find it can not be classed with either.

Family SPARIDÆ. The Porgies.

Lethrinus cutambi[6] Seale sp. nov. Plate X. (Cutambak.)

Head 3; depth, 2.75; dorsal X, 9; anal III, 8; scales 6–45–13; eye 4; snout 2, width of maxillary at symphysis almost equal to pupil; its length 2.75 in head; mandible 2.45; width of preorbital 2.95; pectorals 1.20; ventrals 1.50; interorbital space 1.10 in eye.

Body oblong compressed, the greatest depth being at origin of ventrals. The upper outline of body from occiput to axil of dorsal is an even curve, the forehead in front of eye is slightly convex while the snout is decidedly concave, the lower outline of body much less curved than upper; the lower jaw being very slightly oblique. The length of the caudal peduncle is 2 in head, its median width is 3.50 in its length, while its depth is 1.50 in its length.

Greatest depth of head slightly less than its length, its greatest width 2.20 in its length; interorbital space convex. Snout is elongate, its median width being about 2 in its length, nostrils some distance apart, the anterior one with membranous flap. Mouth large, the lips with thick membranous folds. The upper jaw strongly protractile. Teeth of upper jaw consisting of a single row of about six conical molars without cusps on each side, with small conical canine-like teeth anteriorly and with four enlarged outer canines in front. Lower jaw with about eight conical molars without cusps, and small canines, anteriorly, two enlarged outer canines on each side in front. No teeth on vomer,

[6] From the native name of this fish.

palatine or tongue. The jaws are equal, the maxillary ends on a line with anterior nostril, its end is fully hidden by preorbital. The mandible ends on a line with posterior nostril. Gill openings are of moderate size being carried forward to a line with middle of eye. Gill rakers are thick and short 5 on lower limb, the longest about one-fourth of pupil. Pseudobranchia present.

Body fully covered with rather large smooth scales which are very slightly denticulate on margins. Fins are unscaled, except pectorals which are slightly scaled at base. Head is naked except on opercles, with a small patch of scales behind and posterior to the eye, another small patch posterior to, and slightly above eye.

Origin of dorsal is one spine anterior to a line with axil of pectorals; fourth dorsal spine the longest, 3 in head, the spines received into a sheath, longest dorsal ray 2.50 in head.

The second anal spine is strongest, the third is the longest being 3.10 in head, longest anal ray 2.75, origin of anal is on a line with the second dorsal ray. Origin of ventrals midway between tip of snout and fifth anal ray. Tip of ventrals reaching to anal pore. Pectorals extend to a line with origin of anal. Caudal deeply emarginate, its length 1.25 in head, its shortest ray 2.10 in head.

Color in life rather a dark greenish with 7 or 8 irregular darker vertical bars over back and down on sides. Vertical fins marked with bars of dark green.

Color in alcohol yellowish, with slight shades of greenish, about 8 irregular darker greenish bars extending over back and down on sides to ventral surface, these bars much less than the interspaces, the bands are more or less broken at the lateral line but are continuous below it, there is on the second of these bands above middle of pectorals and below the lateral line an intensified dusky area or blotch, scarcely distinct from coloring of bands. Head is brownish with tint of green, there is a darker band easily overlooked, from lower half of eye down to posterior end of mandible; posterior margin of opercle darker. A darker green line at base of pectorals. A mottling of darker green on the membrane at base of each dorsal spine, each ray of soft dorsal and anal is crossed by one or two darker green blotches. Caudal has three or four darker green vertical bars. Ventrals are crossed by three bars of darker green, pectorals white.

Type is No. 4678, taken at Sitanki Island, Jolo Archipelago, P. I., 11 July, 1908. Length, 210 millimeters. Cotype No. 4680.

Lethrinus atkinsoni Seale, sp. nov. Plate XI. (Cutambak.)

Head 2.90; depth 2.50; dorsal X, 9; anal III, 8; scales 5–48–13; eye 3; snout 2; interorbital space 1.45 in eye (bony part only measured); maxillary 2.50 in head; mandible 2.10; pectorals equal to head; ventrals 1.45.

Body is oblong, compressed, rather deep, greatest depth at origin of ventrals. The upper outline is an even curve to the anterior margin of eye, it is slightly more convex from this point, the practically straight snout extends down to the protractile upper lip, at an angle slightly greater than 45°. Lower outline from anal to tip of snout forming a low even curve, the lower jaw being but slightly oblique. The depth of caudal peduncle is 1.50 in its length, its median width is 3 in its length, while its length is 2 in head. Greatest depth of head equals its length, its greatest width 2 in length; interorbital space slightly convex. Outline of snout almost straight, excluding the protractile upper jaw; width of upper lip at symphysis 2.50 in pupil; maxillary ends slightly posterior to anterior nostril; the mandible ends on a line with anterior margin of eye. Eye is large, 1.50 in snout. Preorbital 2.50 in head, jaws equal. Teeth of upper jaw consisting on each side of three large molars, two of which have cusps, five conical teeth, and two large curved anterior canines, also a patch of minute teeth in anterior of jaw, behind the canines. Lower jaw on each side with four large molars, three of which are biscuspid, five conical teeth, two canines, and a patch of minute teeth just inside the curved anterior canines. No teeth on vomer or palatines, opercle ends in a flat spine and has a rather broad yellow membranous margin.

Gill openings end on a line with middle of eye, the gill rakers are short, thick and blunt, four on lower limb, the longest less than one-fourth of pupil. Pseudobranchia present.

Body entirely covered with large smooth scales which are slightly denticulate on margins; head naked except on opercles and a small patch of scales behind and above eye. The spinous dorsal when collapsed is fully hidden in scaly sheath. Fins not scaled except base of pectorals and caudal. Origin of dorsal is directly above axil of pectoral, its fourth to fifth spines are longest, 2.75 in head. Longest dorsal ray 2.25 in head. Origin of anal is over second dorsal ray, its third spine is the longest, 3.25 in head, the second spine is strongest. Longest anal ray 2.75 in head. Origin of ventrals midway between tip of snout and posterior axil of anal. Tips of ventrals reach to anal pore. Tips of pectorals extend to base of anal. Caudals deeply emarginate, its longest lobe 1.20 in head, its shortest ray 2.30.

Color in life yellow, with slight wash of grayish, fins immaculate, except ventrals which have dusky tips and caudal which is washed with yellow.

Color in alcohol whitish, slightly grayish drab above; the middle of each row of scales darker, making 4 or 5 narrow longitudinal lines above the lateral line, these rows follow the curvature of the back. A large rather indistinct oblong dusky blotch between the pectoral and lateral line, base and upper axil of pectoral grayish. The fins are white,

unmarked except the upper surface of the first ray of pectorals which is gray, and the ventrals, which have some dusky on their posterior third.

Type is No. 5080 taken at Balabac Island, P. I., 6 August, 1908. Length, 220 millimeters.

Family POMACENTRIDÆ. The Damsel-fishes.

Pomacentrus tropicus Seale, sp. nov. Plate XII, fig. 1. (Danigsahasa.)

Head 3; depth 1.95; dorsal XIII, 14; anal II, 14; scales 24, eighteen pores in lateral line, 12 in vertical series; eye 3 in head; snout 3.75; interorbital space 2.75; maxillary 3.50; mandible 3.10; pectorals equal to head posterior to nostril; ventrals slightly longer than pectorals; depth of caudal peduncle 2.10.

Body oblong, compressed, its greatest depth at origin of ventrals, this depth being considerably greater than at origin of anal. Depth of caudal peduncle greater than its length.

Anterior profile from origin of dorsal to tip of snout, is strongly rounded with a very slight constriction on nuchal region. Lower profile not quite so strongly rounded as upper, jaws when closed are equal. Interorbital space evenly convex. Greatest width of head 1.50 in its greatest depth. Snout rounded, its median width being a third less than its depth, its width considerable greater than its length, numerous small pores on top of snout and on orbital ring. Preopercle strongly denticulate, narrow but becoming abruptly wide under anterior margin of orbit, this wide portion ending posteriorly below in one or more strong spines, its anterior margin with a shallow notch; width of preorbital, at angle of mouth, 2 in eye, width below middle of eye, 1.50 in pupil. Maxillary scarcely extending to the anterior margin of orbit; mandible ending under anterior margin of orbit. Teeth in a single row in jaws. They are rather strong and incisor-like, 18 on each side of upper jaw; no teeth on vomer or palatine. Gill openings wide, carried forward to below anterior margin of eye. Gill rakers moderately strong, toothed on their inner side, about 12 on lower limb.

Body and head scaled, no scales on orbital ring. All fins except ventrals more or less scaled; strong scaly sheaths at base of dorsal and anal. The scales are smooth with finely ctenoid margins, those on median portion of sides largest. Three rows of scales on opercle with a few additional small scales on lower margin. Eight scales between dorsal and head, about 14 series on top of head.

Origin of dorsal fin midway between tip of snout and base of twelfth dorsal spine, the median spines of the fin are longest, the first spine is 1.25 in eye, the eighth is 2 in head, the thirteenth is 2.10 in head. The soft dorsal is pointed, its longest ray 1.50 in head. Anal similar to soft dorsal, the second spine is 2 in head, the longest ray equal to length of head posterior of the nostril. Origin of first anal spine is under the

origin of the ninth spine of dorsal, origin of anal is much nearer origin of ventrals than to base of caudal, in fact, the distance between origin of ventrals and anal is considerably less than base of anal. Origin of ventral is midway between anal pore and a vertical line with posterior margin of iris, the ventral rays are more or less prolonged and filamentous, reaching to the origin of anal. Origin of pectorals is slightly anterior to origin of ventrals. Caudal rather long and sharp-pointed, scarcely emarginate, the upper lobe the longer, being longer than head.

Color in alcohol similar to life color except less bright being orange yellow with a slight brownish wash on top of head, fading on shoulders into the yellow body color. A blue line below eye on preopercle, some blue spots on opercle, a blue line on side of snout, a blue line from each side of belly out onto the anal fin where it forms a submarginal blue band, the tips of the anterior anal rays being black, a narrow black tip to spinous dorsal, otherwise fins all bright yellow. A black dot at origin of lateral line, another in upper axil of pectoral fin, lips dusky.

Type is No. 4737 from Sitanki Island, Jolo Archipelago. Taken by C. Canonizado and the writer 15 July, 1908. Length, 750 millimeters Five cotypes No. 4736 were taken at the same time and place.

This species is related to *Pomacentrus popei* Evermann and Seale but the coloring is different and the relative location of the anal and ventral fins is quite different. It is also related to *P. moluccensis* Bleeker, but has larger scales and a sharp-pointed caudal, with the additional differences in color markings.

Pomacentrus elongatus Seale, sp. nov. Plate XII, fig. 2.

Head 3.50; depth 2.15; dorsal XIII, 14; anal II, 15; scales 28, 18 pores in lateral line, 14 scales in vertical series; eye 3.10 in head; snout 3.40; interorbital space 3; maxillary 3.40; mandible 3; pectoral equal to head; ventrals longer than head; depth of caudal peduncle 2.

Body oblong, compressed, rather elongate for this family. Greatest depth in middle of body. Depth of caudal peduncle a fourth greater than its length.

Anterior profile from dorsal fin to snout evenly curved and about equal to curve of thorax and chin. Interorbital space convex. Snout rounded, its median width being slightly less than its length. Orbital ring strongly toothed, unscaled, very narrow below pupil, becoming wider under anterior of eye, its width at angle of mouth 2 in eye. A rather strong spine at posterior margin of this wide portion. Preopercle denticulate. Mouth small. Maxillary ending under anterior margin of orbit. Mandible ending under anterior margin of pupil. Teeth in two series the second being smaller and less securely fixed and alternating with those of the anterior series. Gill openings large, being carried forward to below anterior margin of orbit. Gill rakers slender, about 14 on lower limb.

Scales covering entire body and head, except orbital ring and chin.

Four rows of scales on preopercle, the lower row consisting of three or four small scales. All fines, except ventrals, more or less scaled, dorsal and anal with high scaly sheath.

Origin of dorsal midway between tip of snout and base of 11th dorsal spine, the spines increasing in length posteriorly, anterior spine equal to orbit, posterior spine 1.35 in head. Soft dorsal, caudal, and anal sharp pointed, the caudal scarcely emarginate, the upper lobe the longest. Second anal spine 1.55 in head. Longest rays of anal equal to rays of soft dorsal, 1.10 in head. Origin of anal is on a line with base of 13th dorsal spine, and is but slightly nearer origin of ventrals than to end of caudal vertebra. Origin of ventrals midway between anal and angle of jaw.

Color in life brown, becoming lighter on caudal peduncle, some blue lines on cheeks and top of head.

Color in alcohol is a reddish brown, shading into yellow on caudal peduncle, the caudal yellow, with a very slight wash of dusky. Distinct blue lines of less width than pupil uniting on top of snout extend back to about origin of lateral line at top of eye. Another from anterior of eye to middle of maxillary. A few blue dots on cheeks. A black dot at origin of lateral line. Inner axil of pectorals whitish, giving a more or less distinct white dot in upper axil of fin, pectorals grayish, ventrals black, other fins similar to color of body except the yellow caudal.

Type is No. 2214, collected by the writer and C. Canonizado at Limbones Cove at the entrance to Manila Bay, Luzon, P. I., 14 January, 1908. Length, 765 millimeters. Two cotypes were taken at same time and place, Nos. 2212 and 2213.

This species is *P. trilineatus* of Bleeker, Altas, fig. 3, which we believe to be distinct from the original *P. trilineatus* Ehrenberg.

Pomacentrus suluensis Seale, sp. nov.

Head 3; depth 2.10; dorsal XIII, 13; anal II, 14; scales 25, nineteen pores in lateral line, 12 scales in vertical series; eye 3 in head; snout 3.55; interorbital space 3.20; maxillary 3; mandible 2; pectorals 1.10 in head; ventrals about equal to head; depth of caudal peduncle 1.75 in head.

Body is oblong, compressed, the greatest depth being in the middle of body; upper and lower anterior profiles from base of dorsal and base of ventrals to snout are equal low curves, making the head rather sharp pointed. Depth of caudal peduncle slightly greater than its length. The top of head is almost a straight line from dorsal to snout, the curve being very low. Interorbital space slightly convex, median width of snout slightly greater than its length; two low ridges on upper side of snout; preopercle denticulate. Orbital ring entirely smooth and unscaled, its width at angle of mouth about equal to pupil; suborbital very narrow, less than one-half of pupil. Maxillary scarcely extends to anterior margin

of eye; mandible ending under anterior margin of eye, the lower jaw slightly the longest. Teeth rather strong, in two series, the second alternating with those of first series.

Gill openings wide, carried forward to below anterior margin of orbit, gill rakers sharp-pointed, rather long, about 18 on lower limb.

Body entirely covered with ctenoid scales. All the fins except ventrals more or less scaled. Large scaly sheaths at dorsal and anal, three rows of scales on preopercle.

Origin of dorsal fin midway between tip of snout and base of last dorsal spine, the median dorsal spines are longest, being 2 in head. Longest dorsal ray about equal to longest anal ray, being 1.50 in head; dorsal, anal, and caudal sharp-pointed, caudal scarcely emarginate. Origin of anal under base of eleventh dorsal spine, being nearer origin of ventrals than to base of caudal. Origin of ventrals midway between anal and a vertical line with anterior margin of pupil. Caudal equal to length of head.

Color in life yellowish white, with two reddish brown vertical areas, one occuping the entire head, its posterior border from origin of dorsal to origin of ventrals, the second is from sixth dorsal spine to base of sixth soft dorsal ray down on sides to anterior half of anal fin. A large black yellow-edged ocellus on the last four spines, remainder of soft dorsal and caudal are yellowish white, the anal is bright yellow, some purplish on its anterior part. Ventrals white with some purplish anteriorly; no spot in axil of pectoral or at origin of lateral line.

Color in alcohol similar to above, but the purplish on anal more distinct, forming a dusky anterior border to fin.

Type is No. 4689. Secured by the writer and C. Canonizado at the Island of Sitanki, Jolo Archipelago, 12 July, 1908. Length 355 millimeters.

This species is related to *P. notaphthalmus* Bleeker but differs considerably in the color markings and in having preorbital strongly serrated, the anal fin sharp-pointed and the black spot above operculum absent.

Abudefduf coracinus Seale, sp. nov. Plate XIII.

Head 3.60; depth 2; dorsal XIII, 14; anal II, 13; scales 27; 18 pores in lateral line which ends under middle of soft dorsal, 14 scales in vertical series; eye 3.50; snout 3.10; interorbital space 2.50; maxillary 3.25; mandible 3; pectorals 1.10; ventrals longer than head, 3.15 in length, caudal peduncle 1.60 in head.

Body is oblong compressed, its depth is about the same at origin of ventrals as at origin of anal, depth of caudal peduncle is slightly greater than its length.

Head is evenly rounded. The jaws when closed are equal. The greatest width of head is 1.75 in its greatest depth, the profile both from

the origin of dorsal to snout and from origin of ventrals to snout is a low even curve. The interorbital space is slightly and evenly convex. The snout is rounded, its depth at nostril being greater than its width. Preorbital is rather wide and unscaled, the anterior margin not notched, its width at angle of jaw 1.50 in orbit, its width below middle of eye very little less than its angle. Maxillary ending on a line midway between posterior nostril and anterior margin of eye. The end of mandible not reaching to orbit. Teeth in a single series in jaws, rather strong, fixed, almost conical, and with a slight curve, 20 on each side of lower jaw. No teeth on vomer or palatine. Gill openings large, ending on a line slightly anterior to orbit. Gill-rakers slender and pointed, the longest about equal to pupil, 14 on lower limb.

Scales covering entire body and head except the orbital ring, maxillary, and mandibles; the scales are large smooth with their margins finely ctenoid. Fins scaled, except the ventrals; a high scaly sheath to dorsals and anal. A large axillary scale at ventrals; scales largest on the median anterior part of body; small scales at base of fins and thorax. Six scales between origin of dorsal and head and about 13 series on top of head. Two rows of large scales on the preopercle with two or three small scales on its lower margin.

Origin of dorsal fin about the width of eye posterior to pectoral axil, the first spine being midway between tip of snout and origin of twelfth dorsal spine, the spines gradually increase in length posteriorly, the first spine being 1.30 in eye while the last 2 in head (measured to base of scaly sheath). Soft dorsal rounded, its longest ray 1.25 in head. The anal is similar in shape to soft dorsal, its second spine is 2 in head, the longest ray is about equal to longest ray of soft dorsal; origin of second anal spine on a line with base of 13th dorsal spine, being midway between end of caudal vertebra and origin of ventrals, the first anal spine is quite a little in advance of the second. Origin of ventrals midway between first anal spine and tip of snout; ventrals are slightly filamentous at tip but do not quite reach to anal pore. Pectorals are rounded, the width of their base being 2.50 in their length. Caudal rounded, scarcely emarginate, the upper lobe the longer, being about equal to length of head.

Color in life uniform dark brown or blackish.

Color in alcohol olivaceous black, fins black, opercular flap black. A black dot at axil of pectorals. No ocelli anywhere.

Type is No. 4908. A specimen 123 millimeters in length taken by the writer and C. Canonizado at Sitanki Island, Jolo Archipelago, 18 July, 1908.

This species very closely resembles *A. malas* but is easily distinguished by the naked orbital ring

Family LABRIDÆ.

Halichœres iris Seale, sp. nov.

Head 3.10 (measured to end of opercular flap); depth 3; dorsal IX, 13; anal II, 11; scales 26; 13½ in vertical series; eye 4.50 in head; snout 2.75; interorbital 4.10; maxillary 4.50; mandible 3.

Body oblong, compressed, the upper and lower outlines evenly curved to the rather pointed head and snout. Depth of caudal peduncle 2.1 in head, its length 3 in head. Mouth rather small, the jaws equal, the upper jaw protractile, upper lip with wide fold, lower lip with fold less developed. Teeth in a single series in each jaw, the anterior ones consisting of enlarged projecting canines; they graduate in size posteriorly. No canines at angle of jaws. No teeth on vomer or palatines. Gill openings extend forward to line with angle of preopercle. Gill rakers small, fine-pointed, about 13 on lower limb.

Body covered with large smooth scales, which are much smaller on thorax. Head entirely naked, fins unscaled, except a row at base of dorsal and anal, and basal half of caudal. Lateral line continuous.

The dorsal spines are short and pungent, the origin of the fin is midway between tip of snout and base of sixth dorsal ray, the longest spine about 4.25 in head, the longest ray 3. Caudal is slightly lunate, its length 1.35 in head. Origin of anal midway between the end of last caudal vertebra and the posterior margin of hard opercle, being on a line with the base of third dorsal ray, its base is 1.20 in head, its second spine is longest, 3.25 in head, its longest ray 2.50. Origin of ventrals slightly nearer angle of mouth than to anal, the length 2.10 in head. Pectorals 1.30 in head, ending on a line with ninth scale of lateral line.

Color in life. The general color is greenish above and bluish below; there are seven purplish bands over back which extend obliquely back and down to about the median line of sides, the anterior band is from nuchal region to axil of pectoral, the second from origin of dorsal, third from posterior portion of spinous dorsal, fourth from anterior portion of soft dorsal, fifth from middle of soft dorsal, sixth from posterior portion of soft dorsal and the seventh over the middle of caudal peduncle; these bands are almost as wide as the interspaces. The top of head and nuchal region are purple, there are three wide rosy bands tinted with purplish on sides of head, one from posterior of eye to posterior margin of opercle near base of pectoral, one from lower portion of orbit to lower posterior margin of opercles, one from lower anterior margin of orbit to behind angle of mouth; these bars are of slightly greater width than pupil, the coloring of cheeks between these bars is yellowish, with portions shading into orange and greenish, the lower jaw and throat blue, base of pectorals purplish, the base of rays yellow. Spinous dorsal purplish with deep green on base, the purplish coloring extending back as a

graduating line through the lower half of soft dorsal, general color of soft dorsal, pale yellowish, caudal yellowish with tint of green, the upper and lower rays green with the second ray a heavy brownish red. Anal pale yellowish, ventrals pinkish, pectorals washed with yellowish at base and slightly dusky at tip.

Color in alcohol similar to above, except the bluish below fades into whitish, the deep green on dorsal and between the purple bars fades and becomes dull bluish, the stripes on head brown-purplish, the anal shows a dusky blotch on middle of anterior rays.

Type is No. 4582 from Sitanki Island, Jolo Archipelago, P. I., 2 July, 1908. Length, 112 millimeters.

Choerops palawanensis Seale, sp. nov.

Head 3; depth 2.80; dorsal XIV, 7; anal III, 10; scales 28; 11 scales in vertical series; eye 6; snout 2.35; interorbital 5.50; cheeks with about 6 rows of imbricate scales.

Body oblong, compressed, the upper outline more rounded than lower. Depth of caudal peduncle 2.35 in head.

Upper profile of head a strong even curve back to origin of dorsal. Interorbital space convex. Greatest depth of head 1.14 in its length; mouth rather large, the upper jaw protractile. Lips thick, with fold, four strong projecting canines in the front of each jaw, a canine at angle of upper jaw. Posterior margin of preopercle is finely denticulate. Lower limb of preopercle naked. Gill openings moderate, ending on a line slightly posterior to eye. Gill rakers thick, sharp-pointed, short, about 8 on lower limb.

The scales are large and smooth, fully covering head and body except top of head, snout, limb of preopercle, and chin. Tubules of lateral line strongly branched.

Origin of dorsal midway between tip of snout and base of 12th dorsal spine, the longest spine 3.50 in head, its posterior rays the longest, 2.50 in head. Base of anal 1.15 in head, its posterior ray 2.20, origin of anal is midway between last caudal vertebra and angle of preopercle. Origin of ventrals midway between anal and angle of mouth, the anterior rays elongate, reaching to base of anal. Pectorals 1.25, ending on a line with 12th scale of lateral line. Caudal slightly lunate, 1.15 in head.

Color in life. General color brownish above, whitish below, margins of the scales drab. An oblong bright yellow patch on sides under posterior third of spinous dorsal, a row of about five black spots along the median line, sides of head greenish with tint of yellow, the color below this is blue, a red line back from angle of mouth marks the meeting of these two colors, four greenish lines on sides of snout from eye to mouth, about 6 oblique yellow lines on opercle, three red lines on lower jaw, two rows of dusky dots near base of dorsal fin. Dorsal blue with about 4 irregular rows of red dots tending to form broken vertical lines on

soft dorsal. Margin of spinous dorsal blue. Anal similar to dorsal in color except that the round red spots tend to form two or three longitudinal lines on distal portion of fin. Caudal yellowish green with alternating blue and red dots on sides. Ventrals blue, the webs yellow. Pectorals yellow, blue at base with a ring of red.

Color in alcohol dull light brown with tint of green, the golden blotch and the black dots on sides show distinctly. Markings of dorsal scarcely showing; markings of anal more distinct, the dots being yellow, caudal almost uniform greenish with the slightest trace of markings.

Type is No. 5501, from Puerto Princesa, Palawan Island, P. I., 22 August, 1907. Length, 235 millimeters.

Family SCARICHTHYIDÆ.

Callyodon rostratus Seale, sp. nov. (Ogos.)

Head 2.75, measured from tip of opercular flap to tip of upper teeth; depth 3; dorsal IX, 10; anal III, 9; scales 23; 8½ scales in vertical series; eye 7 in head; snout 2.20; interorbital 3.15, two rows of scales on cheeks, the lower limb of preopercle being entirely naked; only the slightest indication of canine teeth at angle of upper jaw, none on lower; teeth green, the margins crenulate; lips narrow, not covering half of either jaw.

Body oblong compressed, the upper and lower outlines equal, the snout is heavy and deep, the teeth large and exposed, giving a blunt appearance to the head. Depth of caudal peduncle 2.50 in head.

Depth of head 1.40 in its length, the upper and lower outlines with very low angle. Interorbital space convex. Gill openings are carried forward to below eye. Gill rakers numerous, minute and hair-like. Scales large and smooth, 3½ in front of dorsal. Origin of dorsal midway between tip of teeth and second dorsal ray, its longest spine 3 in head, the last ray 3.25. Caudal slightly rounded in middle, the lower ray slightly produced. Base of anal 1.70 in head, its origin being midway between last caudal vertebra and axil of pectoral, its longest ray 3. Origin of ventrals slightly nearer to angle of jaws than to anal, their length 2.10 in head. Pectorals 1.50 in head.

Color in life deep blue-green, more decidedly bluish on belly, which shows three or four longitudinal stripes of darker blue. A yellowish area encircles and occupies the entire caudal peduncle. Cheeks washed with reddish, two darker lines extend back from eye. A red line around lips, a second red line across base of lower jaw. Dorsal red with a green line through center and a deep blue margin. Caudal deep blue, with some of the webs washed with red. Base of anal red, the distal two-thirds blue. Pectorals green, the first ray blue. Teeth green.

Color in alcohol yellowish shaded with dull brownish. A yellow area occupies caudal peduncle, two wide dusky stripes from posterior part of eye, snout greenish. Cheeks and opercles yellowish except the upper portion of opercle which is crossed by the dusky bar. An indistinct line

from below angle of jaws around lower lip, dorsal grayish with yellowish margin and clouded with dusky in center. Caudal yellowish with some lighter markings on webs. Anal whitish at base, the distal two-thirds yellowish. Ventrals yellowish, pectorals yellowish, teeth green.

Type No. 2928 from Zamboanga, Mindanao, P. I., 10 April, 1908. Length, 215 millimeters.

Callyodon hadji[7] Seale, sp. nov.

Head 3; depth 2.45; dorsal IX, 9; anal III, 9; scales 24 to end of caudal vertebra, 8½ scales in vertical series; eye 5.75 in head; snout 2.60; interorbital space about equal to snout; scales on cheeks in three rows, the lower row covering the limb of preopercle; lips rather wide covering about two-thirds of jaws; each jaw with a strong canine near angle; teeth rosy; pectorals 1.30 in head; ventrals 1.75.

Body oblong, compressed, the upper and lower outlines about evenly curved, the head moderately pointed; least depth of caudal peduncle 2.1 in head, being about equal to its length.

Greatest depth of head about equal to its length. Interorbital space convex. Snout not particularly blunt. Lips thin, without folds. Gill openings of moderate size, ending anteriorly on a line with posterior margin of eye. Gill rakers very minute, short, hair-like, at least 22 on lower limb. Pseudobranchia large.

Scales large and smooth. Body and head fully scaled except snout and chin. Six scales in front of dorsal. Origin of dorsal is midway between tip of snout and base of second dorsal ray, its longest spine 2.75 in head, its longest ray 2.75 in head. Base of anal 1.20 in head, its origin midway between end of caudal vertebra and angle of preopercle, its longest ray about 3 in head, origin of ventrals midway between anal and angle of jaws, the fin not reaching to anal pore. Origin of pectorals below origin of dorsal, its tip on a line with ninth scale of lateral line. Caudal slightly lunate, its longest rays equal to pectoral, the mid rays 1.50 in head.

Color in life is chiefly pinkish and bluish green. The throat, thorax, belly and sides below the median line being a bright pink; each scale on entire side in front of caudal peduncle is margined with pink, upper part of sides and back green, upper half of head reddish brown, caudal peduncle blue-green, upper lip bright green with a blue-green line around its base, this line is bordered by pink above and extends to below and slightly posterior to eye. Three short blue-green lines radiate from eye, two backward and one forward. An irregular-shaped bright green area extends from angle of mouth to below eye and down almost to chin. Under lip pink crossed by two deep blue lines, one near margin the other near base of lip. About 8 deep blue spots or dashes on each side of throat. A row of deeper green spots along base of dorsal fin. Dorsal

[7] Hadji=Moro pilgrim or chief.

fin salmon-red with a broad blue-green border. A row of green spots along middle of red portion. Caudal fin pea-green with deep blue upper and lower margin. Anal fin deep red with outer half blue. Pectorals deep blue with 4th to 5th rays bright pink. Ventrals pinkish and yellow with anterior ray blue-green.

Color in spirits uniform dull grayish, whitish on belly, the bright greenish irregular area back of angle of mouth shows distinctly. All markings of the fins dull but show the general arrangement described above, the pectorals are greenish with a darker stripe on second to fourth rays.

Type is No. 5367 from Puerto Princesa, Palawan, 19 August, 1909. Length, 225 millimeters, and cotype 5494 from same locality.

Callyodon albipunctatus Seale, sp. nov.

Head 2.75; depth 3; dorsal IX, 10; anal III, 9; scales 23, 8½ in vertical series; eye 5.25; snout 2.50; interorbital 3.25; two rows of scales on cheeks; lower limb of preopercle entirely naked; lips narrow, the teeth being more than half exposed; teeth pinkish.

Body oblong compressed, under normal conditions the upper and lower outlines are evenly curved; the snout, however, is very deep, giving a blunt appearance to head. Depth of caudal peduncle 2.75 in head. Greatest depth of head 1.35 in its length. Mouth rather large. Teeth prominent, no canines. Gill openings carried forward to a line with posterior third of eye. Gill rakers numerous, minute and hair-like. Pseudobranchia large.

Scales large and smooth, four in front of dorsal. Body and head fully scaled except on interorbital space and snout, preopercular limb and chin.

Origin of dorsal midway between tip of teeth and second dorsal ray, the longest spine 3.10 in head, the longest ray 3.10. Origin of anal midway between axil of pectoral and last caudal vertebra, its base 1.75 in head, its longest ray 3.10. Origin of ventrals midway between angle of jaw and anal, their length 2.10 in head. Pectorals 1.50, caudal truncate.

Color in life. General color of lower parts pinkish, the scales on upper portion of body with greenish bases and margins. About ten distinct round white spots on sides usually in pairs at regular intervals, belly with slight wash of purplish. Dorsal fin uniform pink. Caudal uniform pink. Anal bluish at base, fading to pink distally. Pectorals and ventrals uniform pink, iris golden, snout and chin uniform pink, cheeks with a slight tint of bluish. A wide yellow area surrounding caudal peduncle.

Color in alcohol grayish, base of scales darker, belly purplish, gape and chin and area at base of caudal yellowish. Twelve to fourteen round white spots on posterior half of body, fins uniform grayish green.

Type is No. 4876 from Sitanki Island, Jolo Archipelago, P. I., 18, July, 1908. Length, 170 millimeters.

Callyodon ogos Seale, sp. nov.

Head 3.20; depth 2.70; dorsal IX, 10; anal III, 9; scales 22, 8½ in vertical series; eye 5.50 in head; snout 2.85; interorbital 3.15; two rows of scales on cheeks; the lower limb of preopercle naked; lips wide; a canine tooth at angle of each jaw.

Body oblong compressed, the upper and lower outlines evenly curved; head rather more pointed than is usual in this genus. Depth of caudal peduncle somewhat greater than its length, being 2 in head.

Greatest depth of head 1.14 in its length. Interorbital space convex. The lips are wide, the upper almost wholly covering the teeth, the lower covering more than two-thirds of lower teeth. The teeth in life were rosy. The canine teeth of the lower jaw are largest, those of the upper jaw being rather blunt. Gill rakers fine almost hair-like, short, about 26 on lower limb. Gill openings of moderate width, ending on a line with posterior margin of eye. Pseudobranchia large.

Scales are large and smooth, body and head are fully scaled except interorbital space, snout, lower limb of preopercle and chin, which are naked. Lips thin, without folds.

Origin of dorsal midway between tip of snout and base of first dorsal ray, longest spine 2.25 in head, about equal to longest ray. Base of anal 1.20 in head, the origin of the fin is considerably nearer the end of caudal vertebra than to angle of preopercle, its posterior ray 2.50 in head. Origin of ventrals considerably posterior to origin of pectorals, being midway between anal and angle of mouth, their length 1.50 in head. Pectorals 1.25 in head, their tip on a line with 8th scale of lateral line. Caudal is slightly lunate.

Color in life chiefly blue-green; however, there is a large area occupying the upper and median portion of the sides which is reddish yellow, the margins of the scales in this area are green. The upper anterior portion of back is deep green, the lower portion of sides, belly, and caudal peduncle is deep blue-green. About twelve short red lines radiate from eye. A large wedge-shaped deep green area with red margins extends from posterior margin of eye to posterior margin of opercles, ending just in front of axil of pectorals. Snout deep green. A red line from eye to angle of jaws. Lower lip rosy with blue margin and crossed by blue line at base. Two short longitudinal blue lines on sides of throat, base of pectorals rosy with a deep green line across base of rays. Dorsal rosy at base and broadly margined with deep blue, the median portion of the fin between these colors being bright red above and deep green below, the green color fading out and changing into a bright yellow on posterior portion of soft dorsal. Caudal with upper and lower rays bright blue, the second and third upper and lower rays bright pink, the remainder of fin rather dark blue. Anal blue-green, the margin and base darker blue, the median portion with tint of pinkish, showing some darker greenish blotches between the rays. Ventrals with rays deep blue-

green except second rays which are bright pink. Pectorals uniform red, a green line across base.

Color in alcohol. The above striking colors almost entirely disappear and the fish becomes a dull yellowish brown, the fins show very indistinctly the markings described above, the blue of the margins fading into a yellowish white; the deep green wedge-shaped area between eye and axil of pectorals becomes a yellowish area of no distinct shape, while the lines which radiate from eye almost entirely disappear. The pectoral becomes yellowish white with a dusky dot on its upper axil.

Type is No. 5414 from Puerto Princesa, Palawan Island, 20 August, 1908. Length, 225 millimeters, and cotype No. 5411 from the same locality.

Family PSEUDOCHROMIDÆ.

Pseudochromis aurea Seale, sp. nov.

Head 3.40; depth 3; dorsal III, 26; anal III, 14; scales 41, vertical series 14; eye 4; snout 3.75; interorbital 5; maxillary 2.50, its distal end on a line with pupil; mandible 1.90.

Body oblong, compressed, the upper anterior outline from origin of dorsal to tip of snout is a low even curve, the lower outline comparatively straight. Depth of caudal peduncle 1.85 in head, its length one-half its depth. Mouth of moderate size, the lower jaw projecting. Teeth in front of jaws in several series with about 4 large curved canines, teeth on sides of jaws in single series, teeth on vomer and palatines. Cheeks with 4 rows of scales, opercle with a single flat obtuse spine and covered with large scales. Gill openings carried forward slightly past angle of preopercle. Gill rakers rather flat and wide, about 13 on lower limb. Three membranous points to lower limb of preopercle. Pseudobranchia present.

Entire body covered with fine smooth scales which have a finely denticulate border.

Origin of dorsal midway between tip of snout and base of 11th ray of soft dorsal, the spines rather weak, the longest 3 in head, the longest ray 1.30 in head; caudal rounded, its length equal to head. Origin of anal about midway between end of caudal vertebra and posterior margin of opercles, the length of its base equal to head, its third spine the longest, 2.30 in head, its longest ray 1.50 in head. Origin of ventrals but slightly nearer anal than to tip of snout, the rays elongate reaching to base of anal. Pectorals 1.14 in head.

Color in life bright orange, most of the scales below the lateral line, except on thorax, have a bright blue dot. Two blue lines cross the eye-ball but do not extend out of orbit, head uniform yellow orange, very slightly dark above, fins all uniform orange without markings.

Color in alcohol uniform yellow, most of scales showing indication of a dot on each scale, blue lateral line except on thorax and head; fins yellow, some indistinct indications of dots on anal.

Type is No. 4899 from Sitanki Island, Jolo Archipelago, P. I., 18 July, 1908. Length, 90 millimeters. Numerous cotypes.

Pseudochromis rex Seale, sp. nov.

Head 3.50; depth 2.90; dorsal III, 25; anal III, 14; pores in lateral line 44, 16 scales in vertical series; eye 4.50 in head; snout 3.20; interorbital 4.20; maxillary 2.50, its distal end under anterior margin of eye; mandible 1.90; width of preorbital 1.75 in orbit.

Body oblong, compressed. Upper anterior profile from origin of dorsal to tip of snout, a moderate and even curve. Depth of caudal peduncle 1.55 in head, its length about one-half its depth. Mouth of moderate size. Lower jaw slightly projecting. Teeth in anterior of jaws in several rows with several large curved canines, those in side of jaws in single row, conical, sharp-pointed. Teeth on vomer and palatines. Cheeks with five rows of scales. Preorbital with two or three membranous points; opercles with a single flat spine. Gill openings rather narrow, scarcely extending forward to angle of preopercle. Gill rakers short and thick, with asperites on inner surface, 12 on lower limb. Pseudobranchia present. Entire body and head, except snout and chin, covered with fine smooth scales; scales on opercles largest; fins, except caudal, unscaled. Origin of dorsal midway between tip of snout and 10th ray of soft dorsal, the dorsal spines very thick and stiff, the third the longest, equal to length of snout, the first dorsal ray considerably longer, 1.75 in head. Base of anal almost equal to length of head, its origin midway between end of caudal vertebra and posterior margin of opercle, its longest ray 2 in head. Ventrals 1.40 in head, their spine 2, their origin is midway between anal and gape of mouth. Pectorals 1.20 in head. Caudal rounded in young, but with upper and lower rays slightly produced in old specimens, length of caudal 1.12 in head.

Color in life. Upper anterior portion of head and body dark bluish with a jet black line equal to width of pupil from tip of snout through eye to below the anterior third of soft dorsal, some dusky dots below the posterior half of this line, general color of body yellow, belly and chin pale blue, dorsal dusky on base with bluish wash, the outer two-thirds of fin yellowish white posteriorly, caudal and anal uniform yellow, ventrals bluish white, pectorals yellowish.

Color in alcohol. Upper anterior portion of body and head brownish with some fine black specks. A black line from snout through eye, extending back and becoming more diffused, fading out under posterior third of soft dorsal. Other portions of body yellowish white without markings, dorsal dusky at base, lighter on its distal half, other fins uniform yellowish white.

Numerous specimens. Type is No. 4631 from Sitanki Island, Jolo Archipelago, P. I., 4 July, 1908. Length, 120 millimeters.

Labracinus flavipinnis Seale, sp. nov.

Head 3.50; depth 3.75; dorsal II, 20; anal III, 10; scales 36, lateral line interrupted; vertical series 10½; eye 3.10; snout 4.75; interorbital equal to snout; maxillary 3.75, its distal end under anterior margin of pupil.

Upper and lower outlines of body evenly and equally curved, depth of caudal peduncle 1.75 in head, its length 2 in head. Head moderately pointed. The lower jaw slightly longer. Mouth oblique, small. Teeth of upper jaw fine, in several bands, with about 6 enlarged anterior canines. Teeth of lower jaw in a single series on sides with two enlarged canines and bands of small teeth in front. Teeth on vomer and palatine. Scales on cheeks in three rows; opercular and preopercular margins entire. Gill openings wide, being carried forward to a line with posterior margin of orbit. Gill rakers thin, sharp-pointed, short, about 12 on lower limb.

Body and head, except snout and chin, covered with rather small smooth scales, caudal scaled for half its length, other fins unscaled, about ten rows of scales in front of dorsal. The two dorsal spines short, the second being about half length of first ray, the longest ray about 2.10 in head. The caudal is rounded, 1.30 in head. Origin of anal midway between end of last caudal vertebra and a line with middle of opercle, its rays about 2 in head. Origin of ventrals slightly in front of origin of pectorals, being considerably nearer the tip of snout than to anal, its length 1.14 in head. Pectorals 1.25.

Color in life yellowish brown, darkest anteriorly, the posterior half of body with some small vertical blue marks. Top of snout, interorbital space and nuchal region back along base of spinous dorsal black. Lower half of spinous dorsal jet black, the upper half orange, a narrow yellow line between the colors. Caudal yellow, a jet black line extends from along top of caudal peduncle into the fin where it forms a submarginal wedge-shaped band; anal and ventrals pink; pectorals yellowish brown.

Color in alcohol similar to above but less bright, the bluish markings obsolete.

Type is No. 4410 from Zamboanga, Mindanao, P. I., 11 June, 1908. Length, 46 millimeters.

Family OSPHROMENIDÆ.

Osphromenus insulatus Seale, sp. nov.

Head 3.18; depth 2.75; dorsal VII, 8; anal XI, 32; scales about 45 in lateral series, from 20 to 34 pores in lateral line which is very irregular, in the type specimen the line is broken on one side and jumps 4 scales, in some cotypes the line is broken in two or three places and jumps several scales, in the type the lateral line has a distinct arch anteriorly as in the carangoids, becoming more or less straight about the middle

of fish; ventrals 5, the first ray filiform, extending to caudal, the other rays very small, almost atrophied. Maxillary short, slightly less than diameter of eye; interorbital space 2.50 in head.

Body oblong, compressed, the head is pointed, the profile from nuchal region to tip of snout is very slightly concave. Depth of caudal peduncle 2.35 in head.

The interorbital space is slightly convex, the mouth is small and directed upward, the lower jaw strongly projecting; width of preorbital is two-thirds of eye, it has a strong notch which receives the tip of the maxillary, lower margins of preorbital provided with about 8 distinct teeth. Jaws with bands of small sharp teeth including several enlarged canines, the latter being curved and more or less projecting; no teeth on vomer or palatine. The posterior margin of preopercle is entire, but its lower limb is margined by a row of long sharp teeth. Opercle without spine, ending in a sharp membranous flap. Three rows of scales on opercles and four on cheeks. Gill openings united on isthmus. Gill rakers numerous, short, flat, sharp-pointed.

Entire body including head covered with fine ctenoid scales, scales largest on opercles, soft dorsal with large scales on base, caudal and anal scaled, throat scaled.

Origin of dorsal is midway between pupil and end of last vertebra, the spines graduate in size, the last one the longest, about 2.1, the rays in male specimens elongate, greater than length of head, caudal slightly inclined to be bilobed, its length slightly greater than head. Spinous anal fitting into a scaly sheath, origin of its first spine midway between tip of upper jaw and ninth anal ray, the spinous portion contained about twice in soft posterior portion, the longest spine about 3 in head, the longest ray 1.35. Origin of ventrals in advance of pectorals, their anterior ray reaching to, or almost to, base of caudal. Pectorals about equal to length of head.

Color in life brown with some irregular blackish marks on shoulders, some yellowish on opercles and on thorax, some vivid pink at base of anal, extending almost length of base. Dorsal, yellowish brown in females, brown in males, the rays marked with yellowish dark-ringed spots. Caudal brown with numerous yellowish spots, anal brown with some yellowish spots, pectorals brown, ventrals yellowish, a distinct black spot at base of caudal, another on middle of side.

Color in alcohol similar to above but yellow much faded, and the pink at base of anal disappears.

Type is No. 4951 from lake on Cagayan-Sulu Island, Sulu Sea. Length, 73 millimeters. Numerous cotypes.

It is rather interesting to find this form in a crater lake on this volcanic island, isolated as it is in the Sulu Sea.

Family GOBIIDÆ.

Genus **BIAT** Seale, new genus.[8]

This genus is related to *Oxyuricthys* Bleeker but differs in being without nuchal crest or tentacle and in having the upper teeth in two or more series. From *Gobionellus* Girard it differs in having the teeth firm instead of movable. From *Gobiichthys* Klunzanger it differs in having no tentacle over eye and in other respects. It is characterized by the smooth head, without scales, tentacles, or crest, the extremely elongate fully united ventrals, the fine ctenoid scales which are larger posteriorly and the many rayed (16–17) dorsal and anal

Type is *Biat luzonica* Seale, No. 2040 in collection of Bureau of Science, Manila, from east coast of Luzon Island. Length, 190 millimeters.

Biat luzonica Seale, sp. nov.

Head 4.10; depth 5.10; dorsal VI, 16; anal 17, scales about 110 in a median line; about 25 in lateral series; head entirely naked; eye 4.75 in head; snout 4; eyes close together, the interorbital space less than width of pupil; maxillary 2.45 in head; mandible 2.10.

Body elongate, cylindrical, its greatest width 1.50 in its depth. Depth of caudal peduncle 2.30. Head rather blunt, the anterior profile of head from eye to tip of snout has an angle of about 45 degrees. The mouth is slightly oblique, the lower jaw a little the longer. Gill openings rather wide, being carried forward to a line with angle of preopercle. Gill rakers short and blunt, 10 on lower limb. Margins of opercle and preopercle smooth. The teeth of each jaw are in several series with the addition of an irregular row of short curved canines, the anterior ones being enlarged. Tongue is rounded and adnate to floor of mouth for its entire length. No teeth on vomer or palatine. No barbules or tentacles. Lips with fold of skin, no lines of cirri, or prominent mucous pores, except one with a bifurcated opening on back part of interorbital space.

The entire body is covered with fine ctenoid scales which become larger posteriorly. About 25 series of scales in front of dorsal which, however, do not encroach upon the head.

Spinous dorsal of 6 thin flexible spines which tend to become filamentous, the longest about 1.50 in head, the origin of spinous dorsal is midway between tip of snout and base of third soft ray. Longest ray of soft dorsal 1.45 in head. Origin of anal midway between end of caudal vertebra and angle of preopercle, its base 3.10 in length of fish without caudal, its longest ray 1.50 in head. Caudal lanceolate in shape, its length almost a fourth greater than head. Origin of ventrals midway between anal and angle of mouth, the fin united its entire length, and with a deep membranous cup which has a smooth margin, the fin very

[8] Biat=Philippine name for goby.

long extending to base of anal, its length greater than head being almost equal to caudal. Pectorals 1.14 in head, their bases rather thick but not nearly so strongly developed as in *Periophthalmus*.

Color in alcohol (the specimen was not seen by us in a fresh state) yellowish brown with six wide dark bluish bars over back and sides, the first occupying anterior part of head including the snout and eyes. Second on nuchal region down to opercles. Third from median portion of spinous dorsal. Fourth from anterior third of soft dorsal. Fifth from posterior part of soft dosal. Sixth on base of caudal fin. These bands are but little narrower than the interspaces and the margins are not sharply defined although the bands themselves are quite distinct. A few small yellowish spots probably red or blue in life on upper portion of head behind eye. Spinous dorsal grayish with dusky center, soft dorsal dull yellowish as is also the caudal. Anal yellowish, darker at tip with two or three narrow submarginal lines. Ventrals dark gray. Pectorals yellowish.

Type is No. 2040, from the east coast of Luzon, P. I., June, 1907. Secured by Mr. W. D. Carpenter. Length, 190 millimeters.

MACGREGORELLA,[9] new genus.

This genus is characterized by the presence of numerous striking ridges and pockets of membrane with fringed margins on various portions of the head. The head otherwise entirely naked. No scales in front of dorsal. No pectoral filaments, no barbules, although the folds of membranes from a side view give the appearance of barbules in the figure. Body finely scaled, teeth in bands in each jaw, no large canines, tongue rounded, free at tip. Soft dorsal and anal of 9 to 12 rays. The rays or spines not elongate. Type of genus is *Macgregorella moroana* Seale from Jolo, No. 3575 in fish collection of Bureau of Science.

Macgregorella moroana. Seale, sp. nov.

Head 3.60; depth 5.50; dorsal VI, 11; anal 9; scales about 46, 16 in vertical series; eye 5 in head; snout 3; interorbital, a mere ridge about equal to pupil; maxillary 3.20, its tip not reaching to margin of eye; mandible 2.50; head and nuchal region without scales. The head is curiously marked by numerous membranes with fringed margins, the three large vertical ones on the cheeks being somewhat pocket-like. There are about twelve of these membraneous cross-ridges between the tip and the angle of the preopercle, with two wide longitudinal membranes on the median line of lower jaw, preorbital and snout each with two or more membranous ridges, longitudinal as well as vertical membranous ridges on cheeks. Lips with folds, mouth small, bands of small teeth in each jaw, the outer series in upper jaw slightly enlarged, no decidedly

[9] Named for Richard Crittenden McGregor in recognition of his noteworthy work in Philippine zoölogy.

enlarged canines; the orbital ridges are not prominently developed nor roughened. No filiform rays to pectorals, no barbules. Gill openings confined to sides. The origin of dorsal is midway between tip of snout and seventh dorsal ray, none of the spines elongate, the longest about 1.50 in head, longest dorsal ray 1.40 in head. Caudal acuminate, about one-third longer than head, longest anal ray 1.30 in head, pectorals almost equal to length of head.

Color in life yellowish white, marbled and mottled with brown and grayish. Three irregular-shaped oblique dusky bands backward and downward, one from spinous dorsal, two from soft dorsal; some dusky stripes on sides of head, one from snout to eye, another from eye to upper margin of opercle, another from posterior margin of eye obliquely backward, two others on lower sides of cheeks. Dorsal yellowish with dusky blotch in lower central portion and some other slight shadings of dusky scattered over the fin. Soft dorsal with about three oblique dusky bars, the middle one most distinct, posterior tip of fin dusky. Caudal yellowish gray with three dark bands triangular in shape, the angle pointing backward. Anal yellow with three dusky oblique bars, posterior tip of fin dusky. Ventrals pinkish with slight blotches of dusky. Pectorals yellowish, a dusky irregular bar running out on upper half of fin.

Color in alcohol. Similar to above but with the brown markings showing more distinctly, there being a dusky bar on sides of belly and another at origin of anal. A brown bar across nuchal region, a distinct brown bar obliquely downward and backward from eye, another in front of eye, and three on lower part of cheeks, fins colored as in life.

Type is No. 3575 from Jolo, Jolo Island, P. I. Length, 54 millimeters.

Rhinogobius perpusillus Seale, sp. nov.

Head 3.85; depth 4; dorsal VI, 14; anal 14; scales 56, about 20 in vertical series; eye 3.85; snout 4; interorbital about equal to snout; maxillary 2.75 in head, its tip under anterior margin of pupil; mandible 2.30. Head naked except about 3 rows of scales on upper third of opercle, nuchal region finely scaled. No filamentous pectoral rays.

Body somewhat oblong and compressed, the upper and lower outlines about equally curved, the depth of caudal peduncle 2 in head. The head is rather bluntly pointed, the median width of snout being about equal to its median depth. The mouth is oblique, the lower jaw slightly longer. The tongue is rounded and adnate to floor of mouth. Teeth in upper jaw in two rows those of the outer row enlarged, curved, those of lower jaw in two rows rather large, curved, the outer ones projecting; an enlarged, recurved canine on side of jaw, no teeth on vomer or palatine. Gill openings small, restricted to sides. Body and nuchal region covered with fine scales which are slightly roughened at their margins. Origin of dorsal is midway between tip of snout and base of fourth dorsal ray, its spines not elongate, the longest 2 in head, longest dorsal ray 1.50.

Origin of anal about midway between base of anal rays and angle of preopercle, its rays not elongate. Origin of ventrals much nearer tip of snout than to anal, being directly below the origin of pectorals, their length 1.20. Pectorals about equal to head, caudal slightly rounded, about equal to length of head.

Color in life a distinct whitish with a slight wash of yellow, with 3 very dark brown stripes on each side, the first from between interorbitals to and along base of dorsals, the second from tip of snout to caudal, running along the top of caudal peduncle; the third a wide heavy band from around lower lip across cheek and upper base of pectoral to middle of caudal where it ends in a black spot on the middle of caudal base, on the rays; lower half of body uniform whitish unmarked, dorsal whitish crossed by a dark band on upper third, soft dorsal grayish, darker on posterior half and with dark bar near top of fin. Caudal yellowish with dark brown line extending out on upper and lower margins. Anal yellowish at base, becoming dark on outer half; ventrals yellowish with slight grayish shading. Pectorals yellow.

Color in alcohol is similar to above but is less bright. In two specimens Nos. 1276 and 5106 the side bands are almost obliterated or small, except the wide heavy band from lower jaw, and the black spot on caudal, these specimens also show very indistinct indications of about 5 grayish cross-bands over back, they may be a distinct form.

Type is No. 4022 from Zamboanga, Mindanao. Length, 45 millimeters.

Rhinogobius carpenteri Seale, sp. nov.

Head 3; depth 6; dorsal VI, 9; anal 9; scales about 38, $8\frac{1}{2}$ in vertical series, a few scales directly in front of dorsal, otherwise the entire nuchal region and head naked; eye 5; snout 2.80; interorbital about equal to pupil; maxillary 2.55; mandible 2.10.

The upper and lower outlines are but little curved; the head is bluntly pointed, the depth of caudal peduncle is about 3, its length 1.50 in head, greatest width is at head which is 1.50 in its length, its depth being 2.25. Jaws even, mouth small, tongue almost square at tip. Jaws with several rows of teeth, the outer of which are sharply curved, canine-like. No teeth on vomer or palatines, cheeks fat. Gill openings restricted to sides. Gill rakers short, flat, about 7 on lower limb.

Origin of dorsal posterior to ventral, its longest spine 1.85 in head, the longest dorsal ray 2 in head. Origin of anal nearer to base of caudal than to origin of ventrals, being under the base of fourth dorsal ray, the longest ray 2.50 in head. Ventrals very short and disk-like, length 1.75 in head, their origin much nearer tip of snout than to anal. Caudal rounded, its length 1.30 in head. Pectorals 1.30 in head.

Body covered with small smooth scales with very fine ctenoid edges, no scales on nuchal region or head.

Color in life dull yellow-brown, uniform whitish on under jaw, eyes

blue, fins grayish, 2 anterior spines silvery white, rays of anal silvery white, caudal washed with dusky at tip.

Color in alcohol similar but less bright. Numerous specimens. Type is No. 914.

All specimens and type from the Trinidad River, Baguio; elevation, 1,500 meters; Luzon, P. I.

Pleurogobius boulengeri Seale, sp. nov.

Head 3; depth 3.75; dorsal VI, 12; anal 10; scales about 30, 9 in vertical series; eye 3 in head; snout 4.50; interorbital a mere ridge, being less than pupil; maxillary about equal to eye, ending on a line with margin of eye; mandible 1.85 in head; head naked except a few scales on upper edge of opercle and on nuchal region.

Upper outline of body more curved than lower, the greatest depth at origin of dorsal, the greatest width being at opercles where it is 1.35 in head. Head rather blunt, the lower jaw projecting, the mouth being somewhat oblique. Depth of caudal peduncle 2.50 in head.

Head without barbules or cross-lines of cirri on cheeks, median portion of snout, however, somewhat roughened by two prominent lines of mucous pores. Mouth rather large, tongue free, sub-truncate at tip. Teeth in several rows in each jaw, the outer row enlarged, curved, canine-like, but without prominent recurved canine on sides of lower jaw. Gill openings restricted to sides.

Body fully covered with fine smooth scales which cover nuchal region and extend slightly on upper margin of opercles, otherwise head entirely naked.

Origin of dorsal midway between tip of snout and base of fifth dorsal ray, the spines fine, not elongate, their longest 2.25 in head. Longest soft dorsal ray 1.75 in head; caudal rounded 1.25 in head. Origin of anal is midway between end of caudal vertebra and the angle of the preopercle, its longest ray 1.85 in head; origin of ventrals nearer tip of snout than to anal pore, their length 1.10 in head. Pectorals scarcely equal to head.

Color dark brown banded by 12 narrow white, dark-margined vertical bands which completely encircle the body and are of much less width than the interspaces, four of these bands are on the head, the first over the snout just in front of eyes and down to angle of mouth, the second from outer part of nuchal region down through eyes, the third and fourth from nuchal region down sides of head, the fifth from origin of dorsal over base of pectorals, the remainder at regular intervals on body, there being one around the middle of caudal peduncle and another at base of caudal; these last two indistinct. Vertical fins uniform dark grayish, pectorals and ventrals yellowish white.

Type is No. 5505 from Puerto Princesa, Palawan Island, P. I. Length, 35 millimeters.

Named for Doctor Boulenger of the British Museum whose work on Palawan fishes I have found of great assistance.

Gnatholepis davaoensis Seale, sp. nov.

Head 3.75; depth 4.20; dorsal VI, 12; anal 11; scales about 26, in lateral series; cheek and opercle scaled; eye 3.75 in head; snout 3.75; interorbital a mere ridge; maxillary 2.85, ending on a line with anterior margin of eye; mandible 2.

Upper and lower outlines of body about evenly and equally curved, depth of caudal peduncle 2 in head, its length 1.25 in head. Head rather bluntly rounded, the mouth oblique, jaws equal, tongue strongly bilobed, teeth in upper jaw in several series, the outer one being enlarged curved canines. Teeth of lower jaw in two series, the outer one of curved projecting canines, a large recurved canine on each side. No barbules, margin of preopercle entire. No filamentous pectoral rays. No mucous cirri.

The body and head, except snout and chin, are fully scaled, the scales being large, thin and smooth, three rows on cheeks.

Origin of spinous dorsal, midway between tip of snout and base of fifth dorsal ray, the longest spine 1.30 in head, about equal to longest ray. Caudal rounded, a fourth longer than head. Origin of anal is midway between end of caudal vertebra and angle of mouth, being on a line with the second dorsal ray, its longest ray equal to head. Ventrals very long, equal to caudal, their tips reaching to anal, their origin much nearer tip of snout than to anal, being directly below the base of the pectoral. Pectorals equal to head.

Color dull yellowish gray with 6 dusky blotches along sides, three or four distinct black dots at base of caudal, a black band from eye to middle of throat, some scattered black specks over body and indistinct indication of some dusky bars over back. Spinous dorsal grayish with several scattered dusky spots and ten black dots on lower part of fin. Soft dorsal grayish, anterior rays with slight indications of darker cross bars. Caudal grayish with numerous indistinct brownish dots and several larger distinct black spots on lower half of fin. Anal is most peculiarly colored with round black and white spots alternating as on a checker board. Ventral grayish with a black margin, pectorals grayish.

Type is No. 3858 from Samal Island, Gulf of Davao, Mindanao, P. I. Length, 45 millimeters.

This may be identical with the fish called *G. deltoides* by Jordan and Seale in Fishes of Samoa, but their specimens differ decidedly from the type of *G. deltoides* in lacking the characteristic markings which were present in all our 18 specimens from Guam, and in our Philippine specimens also, which are, however, different from the Guam form, therefore we deem it best to give this present species a new name, and it is probable that the Samoan specimens, also represent a new species.

Vaimosa microstomia Seale, sp. nov.

Head 3.80; depth 3.50; dorsal VI, 8; anal 8; scales 27, 8 in vertical series; eye 3.75; snout 5.25; interorbital about one-half diameter of eye; maxillary 2.75 in head, its tip under anterior margin of eye; no filaments on pectorals, nuchal region and opercles fully scaled, cheeks otherwise naked, the cheeks proper being crossed by 2 short lines of mucous pores. No elongate rays or spines.

Upper and lower outlines of body about equally curved, snout is bluntly rounded, heavy, overhanging the mouth; upper jaw slightly projecting. Depth of caudal peduncle 1.50 in head, its length about equal to head. Mouth small. Tongue truncate. Teeth in minute bands in each jaw, no enlarged canines. No teeth on vomer or palatine. No barbules. Gill openings restricted to sides.

Body covered with firm smooth scales which have a slightly roughened margin. Origin of dorsal fin midway between tip of snout and last dorsal ray, the longest dorsal spine about 1.50 in head, there are seven scales in front of dorsal, there are seven rows of scales between origin of spinous dorsal and origin of soft dorsal, longest dorsal ray 1.50 in head. Caudal rounded and considerably longer than head. Origin of anal midway between end of caudal vertebra and the angle of preopercle, its longest ray 1.50 in head, ventrals much nearer tip of snout than to anal, their length equal to head. Pectorals equal to head.

Color yellowish, specked and blotched with brown, some larger dusky blotches along median line, under surface white, about seven indistinct dusky bars over back. A dusky line from eye obliquely downward and backward to in front of preopercular angle. Opercles with a large dusky blotch, spinous dorsal with a large black blotch on its posterior portion, soft dorsal crossed by about six rows of small brown dots. Caudal with eight vertical brown lines. Anal yellowish with an indistinct dusky submarginal area. Ventrals and pectorals yellowish.

This species is especially characterized by the large rounded overhanging snout, the small mouth, and the small spinous dorsal.

Type is No. 827. Length, 45 millimeters. From Malabon, Luzon Island, July, 1909.

Family CALLIONYMIDÆ.

Callionymus inversicoloratus Seale, sp. nov.

Head 3.65 (measured from pore to tip of snout) depth 5.75; width at base of pectorals 4.50; dorsal IV, 8; anal 7; no scales; lateral line distinct running along dorsal surface to slightly above the center of caudal; snout 2.30; interorbital space scarcely equal to pupil; maxillary about equal to orbit; mandible equal to snout; eye 2.40; preopercular spine short and strong with three branches of almost equal size, one directed backward, one directed outward and forward, one directed inward and upward.

This species has the characteristic shape of the callionymids, the depth of the caudal peduncle is less than eye, the snout is depressed and pointed, the interorbital space a mere ridge, not concave. The preorbital bones expecially prominent. The mouth is large, the upper jaw rather heavy. Bands of small sharp teeth in jaws, none on vomer or palatine. Nuchal region with four bony asperites one in middle and back of interorbital space, one on each side of nuchal region and a small one in a median line behind these two. Gill openings confined to a pore on distal surface. Origin of dorsal midway between tip of snout and base of sixth dorsal ray, the spines not elongate, the longest 1.75 in head, the membranous portion somewhat quadrangular, longest dorsal ray 1.14 in head, the anterior and the posterior rays being longer than the others. Anal rounded, its length 2 in body. Origin of anal midway between tip of snout and base of caudal rays, its posterior ray the longest, being about equal to head, the first ray is directly on a line with second ray of soft dorsal, ventrals in front of pectorals, without free rays, their length greater than head. Pectorals scarcely equal to head.

The peculiar thing about this species is that the color pattern is inverted from the usual order; the back being uniformly grayish without markings while the entire ventral surface below the median line of sides is beautifully variegated and covered with brown spots with white ray-like markings, these white markings uniting into more or less distinct network, top of head plain gray, sides of head with blue lines and dots with some brownish blotches, a black spot at base of opercular spine and with a narrow dusky line extending from this spot to angle of jaws. Dorsal fins plain grayish, caudal white with three rows of vertical black dots and with the two lower rays dusky. Anal white at base, dusky on its outer half, some narrow blackish marks on center. Ventrals grayish with some dusky and some bluish specks. Pectorals whitish with several rows of smaller inconspicuous brown dots, about three brown spots on base of fin.

Type is No. 3748, from Samal Island, Gulf of Davao, Mindanao, P. I. Length, 60 millimeters. Ten cotypes.

Calliurichthys neptunia Seale, sp. nov.

Head 4.75 (measured from tip of snout to pore of gill openings); depth 11.75; dorsal IV, 9; anal 8; no scales; lateral line distinct and on the dorsal surface, extending out on caudal posteriorly; eye 3 in head; snout 2.30; interorbital less than pupil; a strong straight spine at angle of opercle, six short teeth on its anterior surface and a short spine directed forward at its base, caudal extremely elongate, about one and a half times longer than body without caudal; maxillary 2.75 ending on a line with anterior orbital ridge; mandible 2.55 in head.

Body rather flat, depressed and triangular shaped anteriorly in its lateral outline, cylindrical posteriorly; snout depressed. Interorbital

space a mere ridge. Depth of caudal peduncle 4 in head. Snout flat, its median depth about one-half its width. Jaws equal, the upper jaw protractile. Bands of short sharp teeth on each jaw, those in anterior of lower jaw largest, projecting, brush-like. Preopercle armed with spine described above, opercle unarmed. Gill opening confined to a small pore on dorsal surface just exterior to origin of lateral line. A roughened plate with ten tubercles on top of head posterior to eyes. Outline of spinous dorsal almost square, the 1st to 3rd rays elongate filiform, longer than the webbed portion, the longest dorsal ray is almost 2 in length of fish without caudal, the origin of spinous dorsal is midway between tip of snout and 3rd dorsal ray. Posterior ray of soft dorsal the longest 1.1 in head. Caudal lanceolate and elongate, the two median rays extremely filiform. Origin of anal slightly nearer tip of under jaw than to base of caudal, its anterior ray being on a line with second ray of dorsal, its longest ray equal to head. Ventrals jugular, their base connected by membrane with base of pectorals, their longest ray 3.50 in body without caudal. Pectorals about equal to head.

Color in alcohol brownish above with numerous black specks and line-like blotches, mingled posteriorly with small bluish white markings, uniform yellowish white below the middle of side, belly bluish white. A dark brown mark extending the length of throat becoming cross-shaped on the thorax. Branchiostegal membranes with numerous fine white longitudinal wave-like lines. A dusky bar vertically downward from eyes. Spinous dorsal dusky, somewhat lighter on its upper and lower borders. Soft dorsal white with numerous fine black broken lines and dots. Anal white at base, outer half black, bordered by a fine white line. Caudal with alternating white and black areas or bars. Ventrals grayish mottled with fine dots and lines. Pectorals with fine brownish specks, outer third of lower rays white.

Type is No. 2317 from Balayan Bay, Luzon, P. I., 20 January, 1908. Length, 190 millimeters, and cotype from same locality, length, 160 millimeters.

This species is quite different from *C. longicaudalis* with which I have compared it.

Synchiropus zamboangana Seale, sp. nov.

Head 3.70; depth 5.20; dorsal IV, 8; anal 7; body and head without scales, a single well-developed lateral line; eye 4 in head; snout 3; interorbital about equal to pupil; maxillary slightly less than eye, its tip scarcely reaching a line with eye; mandible 2.75 in head; preopercle with a single strong spine directed backward with two small spines on its interior side and two slightly larger spines directed forward on its outer side, the tip of the large spine ends in a line with the gill openings. Villiform teeth in jaws, none on vomer or palatine.

Body cylindrical, snout depressed and pointed, width of head almost a third greater than its depth; depth of caudal peduncle equal to snout.

A roughened asperite on nuchal region behind each eye, the space between these smooth, slightly concave. Interorbital space strongly concave, profile of snout concave, anterior ocular ridge especially prominent. Gill openings confined to a small pore on dorsal surface.

Origin of dorsal is midway between tip of snout and base of second dorsal ray, the anterior spine prolonged, the first 2.14 in length of fish without caudal, the remaining spines are graduate, the last being 2 in head, the origin of the soft dorsal is the width of the eye posterior to last dorsal spine, its longest ray equal to head and longer than its posterior ray. Caudal rounded, its length a third greater than head. Origin of anal midway between base of caudal and angle of ventrals, being below the third dorsal ray, its posterior ray is the longest 1.30 in head, differing in this respect from the shape of the soft dorsal, ventrals are in front of pectorals, a single detached anterior ray which is slightly less than length of head, length of ventrals 2.25 in fish without caudal; pectorals scarcely equal to head.

Color in life brown, marbled and mottled with drab and pale blue. Spinous dorsal brown on lower half, black on upper half, six large yellow spots in the membrane, four between the second and third spines, two between third and fourth spines. Soft dorsal mottled with yellow and brown, its distal third black. Caudal yellow, broadly margined with brown, a submarginal row of brown spots and two additional rows of brown spots on 4 upper rays near base and middle of fins respectively. Anal yellowish at base, dusky on outer two-thirds, about three longitudinal rows of bright blue dots extending the length of fin. Pectorals yellowish brown, with darker markings, ventrals yellowish brown, darker on outer third, the lower ray with about four brown bands and tipped with yellow.

Color in alcohol similar to above except that about five darker cross-bands show on the back, and the sides have whitish rings and ocelli; belly white; the spinous dorsal seems to have 3 or 4 dusky cross-bars and a dusky spot between the two last spines. The pectorals have about 5 cross-rows of dots, the lower rays uniform yellow, the ventrals are brownish except at base which has four pale brown bars extending into fin. Top of eyes dusky, some dusky markings on cheeks.

Type is No. 4456 from Zamboanga, Mindanao, P. I., 16 June, 1908. Length, 73 millimeters. Cotype No. 3070.

ILLUSTRATIONS.

PLATE I. Barbus ivis Seale, sp. nov.
II. Oxyporhamphus brevis Seale, sp. nov.
III. Fig. 1. Atherina regina Seale, sp. nov. Fig. 2. Atherina balabacensis Seale, sp. nov.
IV. Mugil joloensis Seale, sp. nov.
V. Mugil banksi Seale, sp. nov.
VI. Caranx auriga Seale, sp. nov.
VII. Caranx butuanensis Seale, sp. nov.
VIII. Epinephelus albimaculatus, Seale, sp. nov.
IX. Dentex filiformis Seale, sp. nov.
X. Lethrinus cutambi Seale, sp. nov.
XI. Lethrinus atkinsoni Seale, sp. nov.
XII. Fig. 1. Pomacentrus tropicus Seale, sp. nov. Fig. 2. Pomacentrus elongatus Seale, sp. nov.
XIII. Abudefduf coracinus Seale, sp. nov.

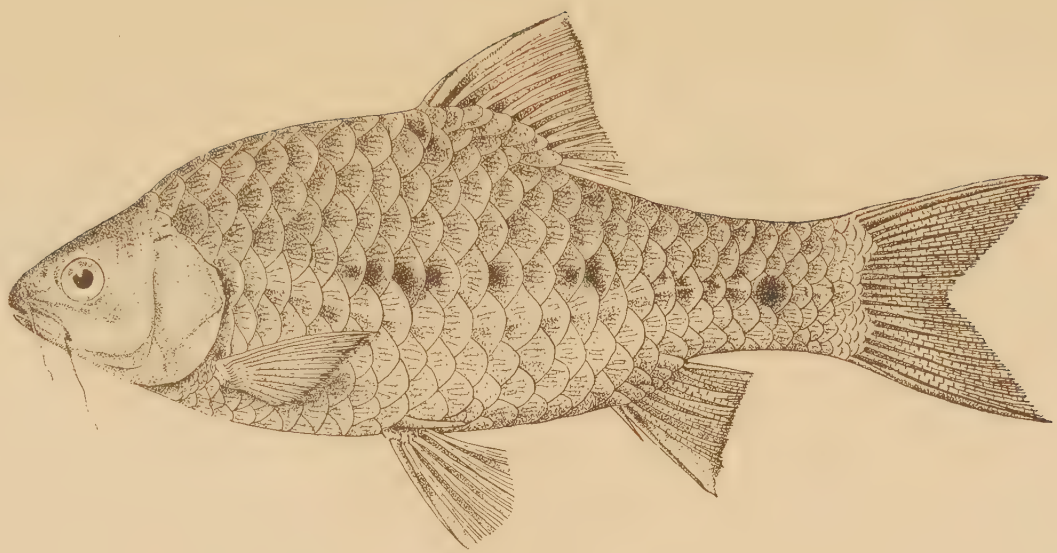


Plate I. BARBUS IVIS Seale, sp. nov.

PLATE II. OXYPORHAMPHUS BREVIS SEALE, SP. NOV.

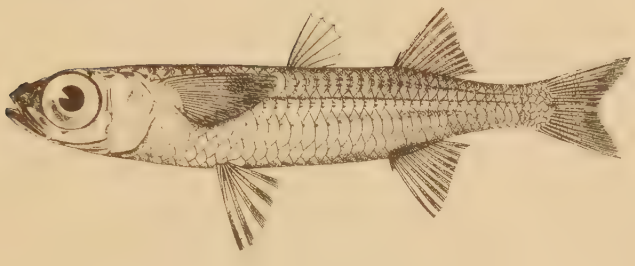


FIG. 1. ATHERINA REGINA SEALE, SP. NOV.

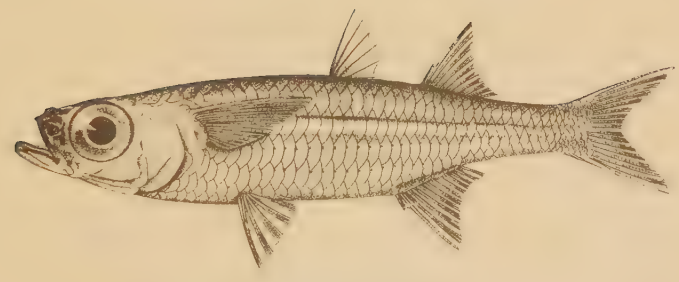


FIG. 2. ATHERINA BALABACENSIS SEALE, SP. NOV.

PLATE III.

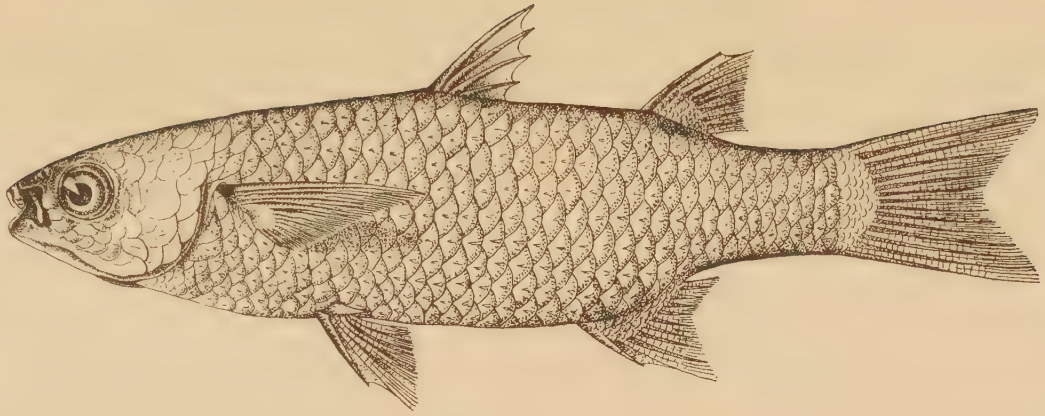


Plate IV. MUGIL JOLOENSIS Seale, sp. nov.

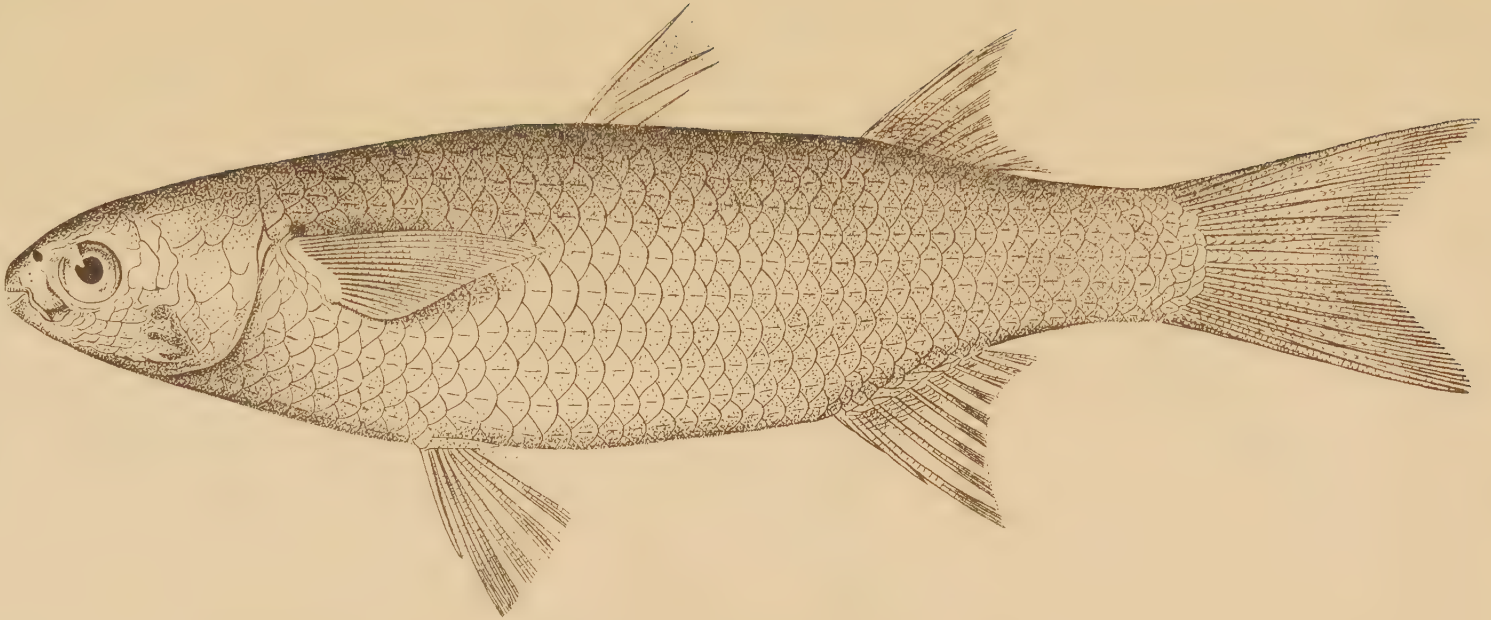


Plate V. MUGIL BANKSI Seale, sp. nov.

PLATE VI. CARANX AURIGA SEALE, SP. NOV.

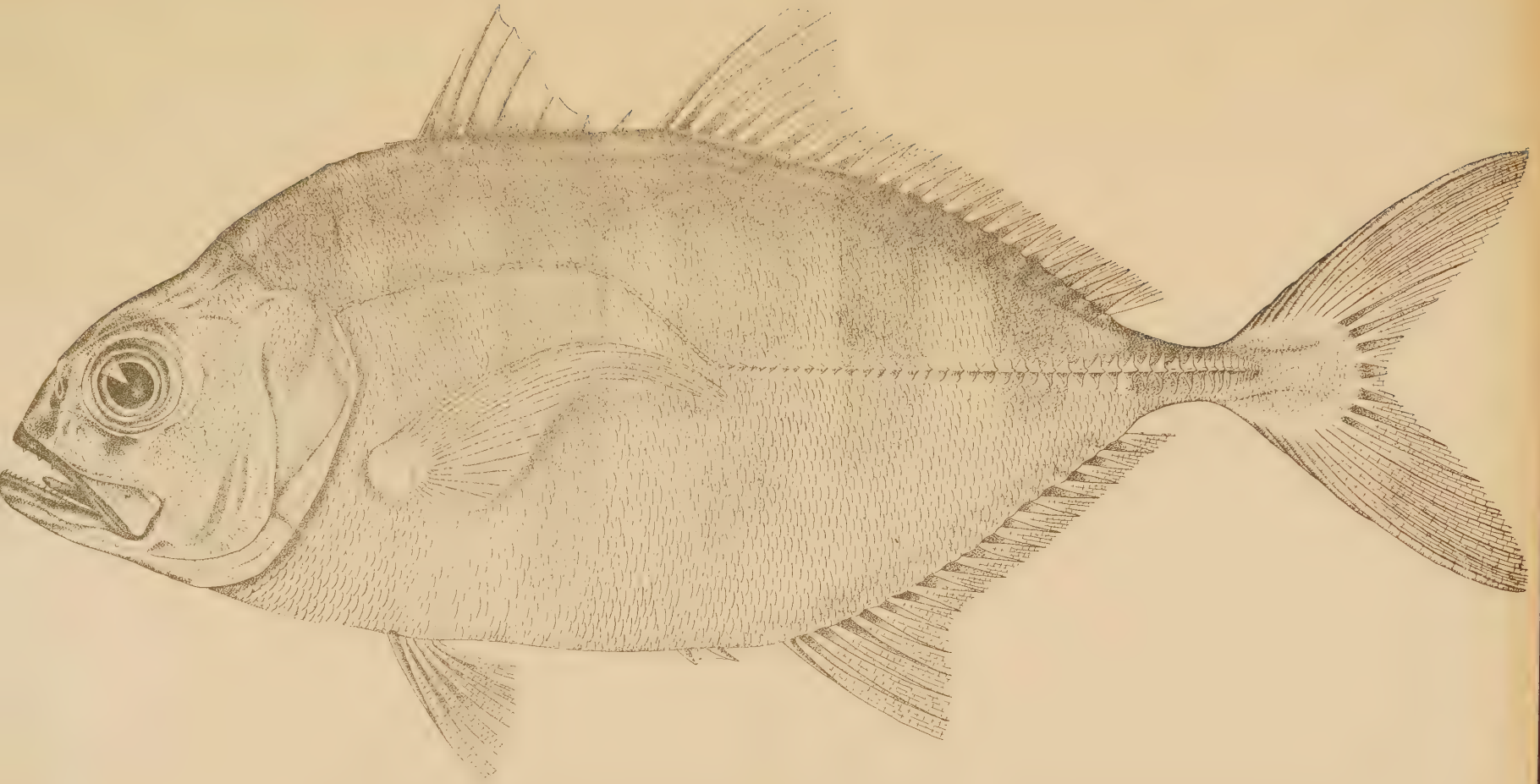


PLATE VII. CARANX BUTUANENSIS SEALE SP. NOV.

PLATE VIII. EPINEPHELUS ALBIMACULATUS SEALE, SP. NOV.

Plate IX. DENTEX FILIFORMIS Seale, sp. nov.

PLATE X. LETHRINUS CUTAMBI SEALE, SP. NOV.

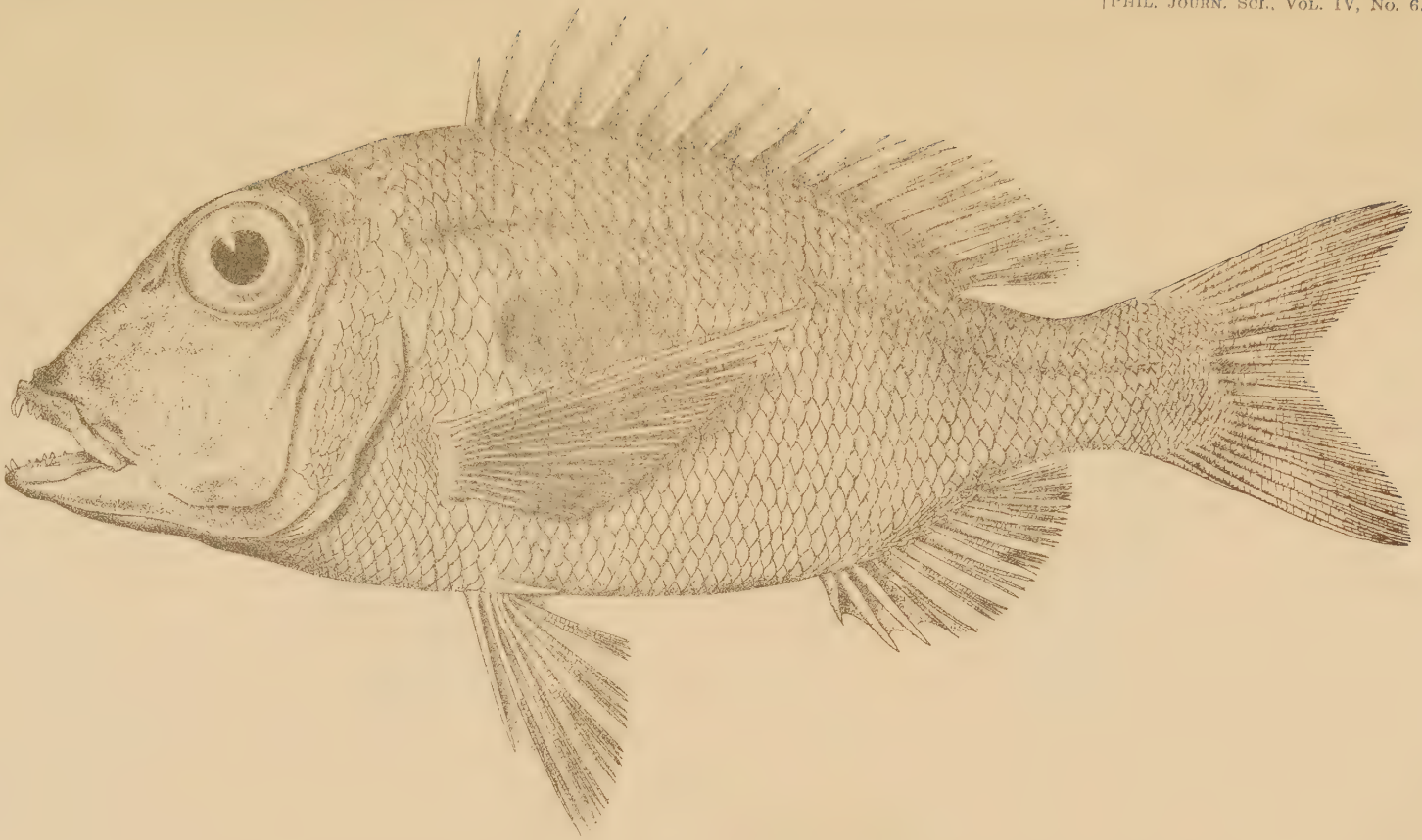


PLATE XI. LETHRINUS ATKINSONI SEALE, SP. NOV.

Fig. 1. POMACENTRUS TROPICUS Seale, sp. nov.

Fig. 2. POMACENTRUS ELONGATUS Seale, sp. no

Plate XII.

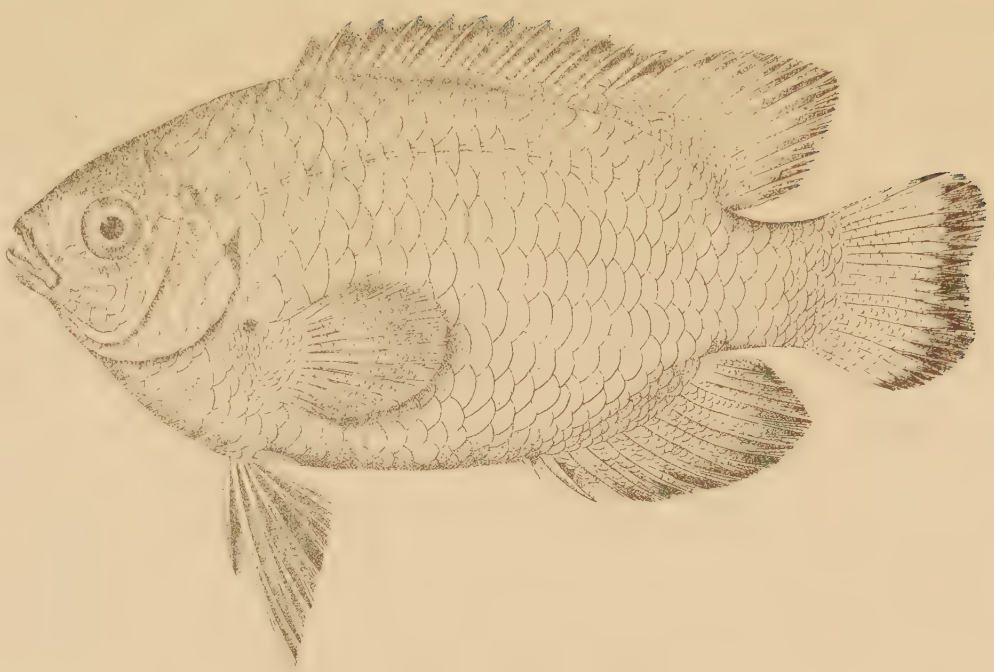


Plate XIII. ABUDEFDUF CORACINUS Seale sp. nov.

FOUR NEW CULICIDÆ FROM THE PHILIPPINES.

By Charles S. Banks.

(From the Entomological Section, Biological Laboratory, Bureau of Science, Manila, P. I.)

In the course of an investigation of the mosquitoes and other insects of the town of Taytay, Rizal Province, during the present year, I was fortunate in being able to obtain full-grown larvæ and breed out adults of two members of the genus *Culex* which prove to be new to science. These forms are so different from known ones and so distinct in their markings that their identification is comparatively easy. They were both found breeding under similar conditions and I hope in the near future to be able to work out their entire life histories.

During a trip to Benguet in 1907, larvæ were taken from water in the pitcher plant (*Nepenthes alata* Bl.) and from these there were obtained a great many adults of a species which also proves to be new. This species belongs to the genus *Wyeomyia* and is thus the first species of this genus to be reported from the Philippines.

In 1906 Mr. R. C. McGregor, of the Bureau of Science, during a trip to the Island of Basilan south of Mindanao, collected a considerable amount of very interesting Culicid material among which is a new species of the genus *Kertészia,* the first record of this genus in the Islands. The two specimens taken by Mr. McGregor are both males and are in perfect condition.

Culex taytayensis, sp. nov.

♀, length 3.5–4 millimeters, length of wing 2.5 millimeters, length of proboscis 1.5 millimeters. Pale brown, head pale grey, abdomen lighter than thorax; legs pale grey-brown; pleuræ with alternate horizontal areas of brown and white.

Head with pale grey narrow scales on occiput and sides, interspersed on occiput with dark, upright, forked scales; eyes red-brown; antennæ, including cilia, dark brown; proboscis unbanded, pale brown, apex darker; palpi less than one-eighth length of proboscis, dark brown, inconspicuous.

Prothoracic lobes brown, with numerous curved setæ; mesonotum with uniform, pale brown, narrow scales interspersed with grey on anterior and posterior areas; scutellum with white or silver-grey scales on median

and pale brown or golden scales on lateral lobes; scutellar setæ long, brown. Metanotum pale brown with four rows of dark brown setæ, those laterad being dense and long; meso- and metapleuræ pale, with a dark brown, horizontal, interrupted fascia extending from the prothoracic lobes to posterior margin of metapleura, ventrad to which is a horizontal fascia of white scales, followed ventrad by another brown fascia. The brown fasciæ are colorations of the integument, the white one is caused by scales.

Halteres pale, dark-tipped.

Abdomen paler than thorax, uniformly colored and with apical golden cilia on each segment.

Femora very pale grey-brown basally, darker apically, as are tibiæ and tarsi; wings with short oval and long narrow scales on costa, subcosta and first longitudinal vein; the second to sixth longitudinal veins with long, oval, median and long, narrow, lateral scales, all pale brown except those on subcosta which are grey; second posterior cell two-thirds length of first submarginal; its stem one-half longer than that of the latter. Supernumerary and mid cross veins touching at their extremities and forming an obtuse angle (140°). Posterior cross vein double its length from mid cross vein. Fringe scales uniformly pale brown.

♂, length 3.5–4 millimeters, length of wing 2.5 millimeters, length of proboscis 1.5 millimeters; differs from ♀ in having the pleural fasciæ more sharply defined; in having white scales on the occiput with few interspersed, erect, forked scales, and in having the abdominal segments clothed laterally and ventrally with dense, long hairs standing at right angles to the body axis. The extreme apex of the proboscis is pale; palpi 1½ times length of proboscis; two apical segments recurved and clothed with dense lateral hairs of the same color as those on antennæ which are concolorous with mesonotum.

Ungues of fore and mid tarsi long, curved, unequal, the larger being unidentate before the middle.

Wings similar to those of ♀ except that there are practically no lateral scales on the veins save at the extremities of the first and second longitudinal and the forks of veins II and IV. All other veins have median scales only.

Rizal, Taytay, P. I., (*Banks,* collector.)

Bred from water of esteros. Eggs hatched 14 May 1909, adults emerged 24 May 1909.

Type of ♂ and ♀ No. 11459 in Entomological Collection, Bureau of Science, Manila, P. I.

This species resembles *C. fatigans* Wied., only in the color of the mesonotum and the general appearance of the legs. It has not the abdominal banding of *fatigans,* nor does *fatigans* have the pleural fasciae as in *taytayensis.*

Culex argentinotus, sp. nov.

♀, length 4.5 millimeters, length of wing 3.5 millimeters, length of proboscis 2 millimeters, general color of mesonotum red-brown, of abdomen dark brown, scutellum entirely covered with silver-white scales giving the appearance of a transverse silver line.

Head with dark grey scales above, flat, pale ocher scales beneath; very long, upright, dark, forked scales over entire occiput; three long, incurving bristles on each side of front over eyes which are nearly black. Antennæ pale brown, first segment ocher; segmental bristles dark brown proximad to white distad. Palpi pale brown, one-sixth the length of proboscis which is also pale brown, except apical sixth which is darker brown.

Prothoracic lobes pale brown with narrow, golden scales; mesonotum with fine, red-brown and golden scales; pleuræ pale; dorsal areas of epimera and episterna with small patches of white scales; golden recurved scales ventrad to base of wing. Scutellum clothed with silver-white scales which form a complete transverse band, and numerous very long, brown bristles from posterior margin.

Abdominal segments dark brown apically, paler basally with white hairs on posterior margins of all except first which is clothed with erect, white hairs among flat scales; ventral surface pale ocher.

Halteres very pale, stem and knob concolorous.

Femora externally dark brown, internally nearly white, paler basally than apically, extreme apices with silver scales which overlap the articulation; tibiæ with dark brown scales, as also all tarsi.

Ungues of fore and mid tarsi equal and with large basal teeth; those of posterior tarsi small, equal and simple.

Wings sparsely clad toward apex with short median and very long, narrow lateral scales noticeable especially on veins II, III, IV and V; supernumerary and mid cross veins in nearly same line; posterior cross vein removed by $1\frac{1}{2}$ times its own length. Lateral fringed scales increasing noticeably in length from vein VI to base of wings.

♂, length 4.5 millimeters, length of wing 3 millimeters, length of proboscis 1.75 millimeters; similar to ♀ in color and markings, including the scutellar silver band. Palpi slightly longer than proboscis, seal brown, recurved as in *C. microannulatus* Theob.; articulations not pale. The occiput clothed with flat, pale ocher scales, dark grey at the nape. Upright, forked scales as in ♀. The seventh abdominal segment in the type specimen is apparently strongly lobed caudolaterally, and the genitalia are different from those of any of the Culicidæ heretofore observed by me. The harpes are unlike those of any species that I have examined previously. The eighth segment is truncately obconical.

The wing veins are almost destitute of long, narrow lateral scales, these

being present only near apex of vein III and anterior fork of IV. The distal half of vein VI is nude.

Ungues of fore tarsi unequal, the larger having a long, acute, curved tooth, the smaller a very short, obtuse dentation; mid ungues unequal, the larger nearly as long as last tarsal segment and having a long curved tooth, the smaller similar to that of fore tarsi.

Rizal, Taytay, P. I., (*Banks,* collector.) Taken at Pinagsalaan well, 13–16 May 1909.

Type of ♂ and ♀ No. 11460 in Entomological Collection, Bureau of Science, Manila, P. I.

This peculiar mosquito merits anatomical study. Its general characters are those of *Culex.* The silver marking and wing squamation suggest *Uranotænia,* while the genitalia appear to be unique. I am at present working on the anatomy of Culicid genitalia and shall leave further discussion of this species until more careful study has been made.

Kertészia, mcgregori, sp. nov.

♂, length 6 millimeters; length of wing 3.75 millimeters; length of proboscis 2.5 millimeters; general color ocher and grey; antennæ golden at tips, brown at bases, legs mottled yellow and brown; wings with brown scales and six white spots on costal vein; cilia all white, except at apex of wing where there is a tinge of yellow. Hind legs with last three joints of tarsi and apex of preceding, pure white.

Head clothed with narrow, cream-colored, appressed scales interpersed with erect, cream-colored forked scales over the entire occiput and front, except a narrow line around and between the eyes; two dark brown bristles project cephalad between eyes and a pair curves over each eye dorsolaterally. Eyes bronze. Antennæ longer than palpi by length of last antennal segment; clothed with brown hairs basally and golden ones apically. First to sixth antennal segments with white scales on their inner sides; apical and penultimate segments with fine golden hairs and a small whorl of bristles at the bases of the former. Clypeus bare, brown; palpi five-sevenths length of proboscis; clothed with brown scales except: base and apex of each segment narrowly, and apical half of apical segment somewhat broadly, white-scaled; a tuft of three brown bristle springs from the points on the apical segment where the white apical scaling ends. Proboscis darkly brown-scaled with a broad band of white near the apex and another narrow one at the middle. Apical segment of proboscis light brown.

Squamation of prothoracic lobes similar in form and color to that of occiput.

Mesonotum clothed with narrow, curved, cream-colored scales dorsolaterally, irregularly placed and sparse. The disc with three distinct longitudinal areas of brown and golden scales, the spaces between being

completely bare and brown. The brown and golden scales form a pattern as follows: a brown patch on the median longitudinal area at the middle of the disc, two brown patches on each of the submedian areas, one before and the other behind the middle, thus forming the corners of a rectangle with a brown spot in its center.

These longitudinal areas have in addition many very long, brown bristles. The submedian areas terminate posteriorly in a tuft of white, curved, spindle-shaped scales, which extend over upon the scutellum; the latter is clothed with three palmate tufts of cream-colored scales from which spring brown bristles which are nearly $1\frac{1}{3}$ the length of the mesonotum; metanotum bare, brown. The bases of the wings are ochraceous and there appear to be well-developed tegulæ. The anterior three veins including costa all darkly brown-scaled, the remainder of the wing very much lighter. The following white spots appear: on the costa six, the first two approximate and sub-basal, the third at first third of costa, the fourth just beyond middle, the fifth halfway from fourth to apex and the sixth just before apex. Spots 3, 4, 5, and 6 appear also on the subcosta and the first longitudinal. A spot appears on subcosta and first longitudinal between spots 3 and 4 of the costa while another smaller spot appears near the bases of veins I and V. The upper fork of vein V has a white spot after the juncture of the posterior cross vein. First submarginal only a little more than half as wide as second posterior, but is slightly longer and its base is more remote from base of wing. There are white scales at the bases of the petioles of the first submarginal and second posterior cells as also at the bases of these cells and the point on vein III where it joins the supernumerary and mid cross veins. The apices of the forks of the first submarginal cell are white, these spots being continuous with the sixth costal spot. The cilia are white except apically where they are tinged with yellow.

Halteres pale.

Basal abdominal segments light brown dorsally, middle and apical dark brown or nearly black, all having apical margins of cream-colored scales, which broaden laterally. There are two submedian discal white spots dorsally on segments 6 and 7, and faint remains of similar spots on 5. The apical half of the abdomen is more or less golden pubescent. Legs generally mottled; all femora and tibiæ brown and gold mottled; all tibiæ apically tipped with cream-colored scales; fore first tarsi [1] dark, cream tipped; mid first tarsi, pale ochraceous, pale tipped at base and apex as are their other tarsi and those of fore feet. Apex of posterior second tarsal segment and all of remaining tarsi nearly pure white. Ungues of fore and mid tarsi unequal and having upon the larger a single tooth which is one-fourth of its length. The smaller unguis is

[1] Formerly improperly called metatarsi.

two-thirds the length of the larger on fore and mid tarsi; the ungues of the posterior tarsi simple and of about the length of the tooth on the unguis of the fore tarsi.

♀, unknown.

Basilan Island, P. I. (*R. C. McGregor,* collector.)

Time of capture, 28 December 1906.

Type of ♂ No. 6666 in Entomological Collection, Bureau of Science, Manila, P. I.

This species is dedicated to the collector.

Wyeomyia nepenthicola, sp. nov.

♂, length 4.5 millimeters, length of wing 3.25 millimeters, length of proboscis 2.5 millimeters. Very dark grey dorsally, silvery white ventrally, legs, antennæ and proboscis black or nearly so.

Head clothed with blue-black, appressed scales; underside and cheeks white-scaled; vertex somewhat lighter, a few erect forked scales on occipital margin. Eyes black, margined with a row of white scales; a white line on vertex between eyes. Antennal segments black, with black whorls and whitish bases; first segment subglobose, pale above; last two segments fuscous; base of proboscis pale, especially beneath nearly white; remainder blue-black; tip curved slightly downward. Palpi black, very short, one-ninth length of proboscis; three-jointed, the first joint very small, subglobular, the second joint 4¼ times as long, the third joint one-half the length of the first, small, conical. Clypeus bare, brown with very slight dark line around margin. A small tuft of bristles projects beneath base of proboscis.

Prothoracic lobes black, shining, with slight grey pruinescence and a few hairs. Mesonotum with blue-black, narrow scales and a slight pruinescence; anterior angles with an area of bluish-white scales sharply defined. A few fuscous hairs at base of wings, together with a row of bristles laterad, extending halfway to anterior margin. Pleuræ with irregular patches of bluish-white scales defined by limits of sclerites. Scutellum clad with flat scales and numerous bristles on each lobe. Metanotum brown, a tuft of four bristles near posterior margin.

Halteres cream-colored with white knobs.

First abdominal segment brown-scaled dorsally, with golden bristles laterally; second to seventh segments uniformly black-scaled with pale brown apical hairs, eighth segment and genitalia brown. A dorsal view shows at either side a very narrow strip of white which represents the white scales on the lateral margins of each tergite. Ventrum of abdomen pure white, except eighth segment which is brown as on dorsum.

Wings hyaline; costa, subcosta and vein I heavily black-scaled; supernumerary, mid cross vein and posterior cross vein are all in the same line; forks of veins II and IV of nearly the same length, the first submarginal being very slightly longer and narrower than the second poste-

rior; vein VI strongly curved outward at apex; forks clothed with long, slender hair-like scales as on veins III and V apically; stems of forked veins with no diverging scales; all fringe scales light seal-brown.

Legs black; femora pale ochraceous at bases, black at apices; mid and posterior femora white beneath; tibiæ and tarsi of all legs black, or dark seal-brown according to reflections. Ungues of fore legs unequal, the longer twice the length of the shorter and with a single tooth. Mid ungues unequal, the longer simple; posterior ungues equal, small and simple.

♀, length 4.5 millimeters, length of wing 3.25 millimeters, length of proboscis 2.5 millimeters, seal-brown, blue-black in certain lights; thorax blue-grey.

Legs dark brown or black according to angle of reflection. All markings exactly as in ♂, except that the tip of the proboscis is brown. The abdomen is widest at the 5th segment and tapers to posterior end while in the ♂ the sides are parallel. Palpi similar to those of the ♂. Antennæ sparsely clad with long hairs and rather thickly with very short ones. The posterior cross vein is removed by its own length from mid cross vein.

Benguet, Trinidad, P. I. (*Banks*, collector).

Collected as larva in pitchers of *Nepenthes alata* Bl., 30 December 1907.

Type of ♂ and ♀ No. 8159 in Entomological Collection, Bureau of Science, Manila, P. I.

RHYNCHOTA PALAWANICA, PART I: HETEROPTERA.

By Charles S. Banks.

(*From the Entomological Section, Biological Laboratory, Bureau of Science, Manila, P. I.*)

The geographical position of the Island of Palawan (Lat. 8° 25′ to 11° 30′ N., Long. 117° to 119° 45′ E.) is such that it forms a natural link between the southwestern part of Luzon and the northern extremity of west Borneo. At no place is there a stretch of water between these two islands or their outlying islands of more than 75 kilometers. However, the fauna of Palawan has been considered in the past to be much more isolated from that of the remainder of the Philippines than from that of Borneo; at the same time it has certain elements peculiar to itself. The same feature has been found to a limited extent, as far as collecting has been done, botanically.

Semper, in his "Schmetterlinge der Philippinen",[1] and Staudinger, in "Lepidoptera von Palawan," describe many species as occurring only in Palawan, which have since been found in other parts of the Philippines. There are likewise many species which have been recorded from Palawan, the remainder of the Philippines and Borneo.

On the 10 April 1909, Mr. W. Schultze of this laboratory collected on the Island of Cuyo a single specimen of *Euchromia horsfieldi* Moore [2] (Lepidoptera), originally from Java and further reported from Bali, Sumbawa and Borneo. As the Island of Cuyo lies 150 kilometers east of Palawan, it is probable that this species reached Cuyo by way of Palawan.

In examining two collections of Rhynchota from this island, made by C. M. Weber during the period from January 1908, to April 1909, and by W. Schultze during the period from 27 February to 8 April 1909, so many forms were found which had been collected previously in other parts of the Philippines that a complete list of the determined species may be of value.

There are 85 species recorded in the first part of this article, including

[1] Reisen auf den Philippinen (1886–1902), II, 5 and 6.

[2] *Proc. Zool. Soc. London* (1859), 27, 200, Pl. LX, fig. 13.

12 which are new and representing 65 genera, one of which is new. There are many species here reported from the Philippines for the first time. Practically all the species taken by Schultze were collected within a distance of 10 kilometers southwest of the capital, Puerta Princesa, while those collected by Weber range from Iwahig to Tara Island north of Palawan Island but belonging to that Province.

In the case of one or two undertermined species, only a single specimen and that one in unsatisfactory condition, was received, so that further material will be necessary before these can be identified and listed. However, sufficient determinable material is at hand to enable me to make a list which will serve for comparison with other regions.

The second part of this paper, Homoptera, will appear in the January, 1910 number of this JOURNAL.

RHYNCHOTA.

HETEROPTERA.

Fam. PENTATOMIDÆ.

Subf. PLATASPIDINÆ.

BRACHYPLATYS Boisduval.

Voy. Astrol. Ent. (1835), **2**, 627.
Type: *B. vanikorensis* Boisd.

1. BRACHYPLATYS DEPLANATUS Esch.

Scutellera deplanata Esch., *Dorp. Abh.* (1822) **1**, 158.
Thyreocoris complanatus Burm, *Nov. Act. Ac. Leop.* (1843), **16**, suppl. 1, 289, Pl. 41, fig. 3.
— —— Germ., *Ztschr.* (1839), **1**, pt. 1, 32.
—————— deplanatus Germ., *tom. cit.* p. 33.
———————————— Herr-Schäff., *Wanz. Ins.* (1839), **5**, 14 and 31.
Plataspis scipio White, *Gray's Zool. Misc.* (1842), 80.
Brachyplatys complanata Dall., *List. Hem.* (1851), **1**, 70.
———————————— Stål, *Ö. V. A. F.* (1870), 611.
—————— deplanatus Stål, *Enum. Hem.* (1876), **5**, 7.

PALAWAN, Tara Island, P. I., (11709 *C. M. Weber*), 4 specimens.

2. BRACHYPLATYS VAHLII Fabr.

Cimex vahlii Fabr., *Mant. Ins.* (1787), **2**, 283.
—————— Coq., *Illustr.* (1801), **2**, 79, pl. 18, fig. 14.
Tetyra —— Fabr., *Syst. Rhyng.* (1803), 142.
Thyreocoris vahlii var., Germ., *Ztschr.* (1839), **1**, 33.
Plataspis ——— Amy. & Serv., *Hém.* (1843), 64.
Brachyplatys —— Stål, *Ö. V. A. F.* (1870), 611.
———————— id., *Enum. Hem.* (1876), **5**, 7.
—————— continua et frontalis Walk., *Cat. Het.* (1867), **1**, 104 & 106.
—————— vahlii Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 10.

PALAWAN, Tara Island, P. I., (11717 *C. M. Weber*), 1 specimen.

This specimen has the small spots on the pronotum and scutellum, mentioned by Distant and also by Fabricius in his original description.

3. BRACHYPLATYS SILPHOIDES Fabr.

Cimex silphoides Fabr., *Ent. Syst.* (1794), 4, 86.
——————— id., *Syst. Rhyng.* (1803), 141.
Brachyplatys silphoides Stål, *Hem. Fabr.* (1868), 1, 5.
——————— liturifrons Walk., *Cat. Het.* (1867), 1, 102.
——————— silphoides Dist., *Ann. Mag. Nat. Hist.* (1899) (7), 4, 214.
——————— id., *Fauna British Ind., Rhyn.* (1902), 1, 12.

Distant says:

"The distribution of this species is at present very difficult to trace owing to the various species wrongly identified under its name. It is certainly known from Borneo."

In the specimens from Palawan, there can be not the slightest uncertainty as to identity, as the markings on the head and abdomen correspond exactly with Distant's description. The fact that the species is positively known from Borneo adds another link to the chain of evidence connecting the fauna of this island with that of the Philippines.

PALAWAN, Tara Island; Iwahig, P. I., (11724 and 11926 *C. M. Weber*), 60 specimens, all characteristically marked, except that spots between the eyes in the ♂'s and some of the ♀'s are obsolescent.

4. BRACHYPLATYS sp.

A single specimen from Tara Island in which the anterior half of the head is ochraceous except the outlines to juga and tylus, which are narrowly brown. The pronotum has, in addition to the one on the entire anterior margin, an extra ochraceous line extending around the anterior submarginal area, beginning interiad to posterior angles and broken on the median line. The base of the scutellum is marked interiad with a transverse ochraceous spot, while its posterior margin is broadly ochraceous. I do not feel justified in describing it as new from a single example, but it appears to conform to no description that I have read.

PALAWAN, Tara Island, P. I., (11716 *C. M. Weber*), 1 specimen.

COPTOSOMA Laporte.

Ess. Hem. (1832), 73.
Type: *C. globosus* Fabr.

5. COPTOSOMA CINCTA Eschsch.

Coptosoma cincta Eschsch., *Dorp. Abh.* (1822), 1, 161.
Thyreocoris seminulum Burm., *Nova Acta Acad. Leop.* (1834), 16, Suppl., p. 290, No. 10.
——————— variegatus Herr-Schäff., *Wanz. Ins.* (1839), 4, 83, Tab. 134, fig. 414.
——————— cinctus Germ., *Ztschr.* (1839), 1, 27, 8.
——————— Herr.-Schäff., *Wanz. Ins.* (1839), 5, 30.
Coptosoma cinctum Dall., *List. Hem.* (1851), 1, 64.
——————— Stål, *Ö. V. A. F.* (1870), 7, 613.

Palawan, Iwahig, P. I., (10902 *W. Schultze*). Seven specimens of this species were taken. It occurs in Negros and in Luzon.

6. Coptosoma erosum Montand.

Coptosoma erosum Montand., *Ann. Mus. Civ. Gen.* (1894), **34**, 131.
" " " " Distant, *Fauna British Ind. Rhyn.* (1902), **1**, 30.

The single specimen agrees with Distant's description in every detail except that the apical margin of its scutellum is light ochraceous instead of "brownish ochraceous and coarsely and darkly punctuate."

Palawan, Iwahig, P. I., (10901 *W. Schultze*), 1 specimen.

7. Coptosoma sp.

A single specimen was collected. It appears somewhat closely related to *C. nepalense* Westw., but owing to lack of sufficient material I am unable to place it with any degree of certainty.

Palawan, Bintuan, P. I., (11698 *C. M. Weber*), 1 specimen.

Subf. Scutellerinæ.

Div. SCUTELLERARIA.

CALLIPHARA Germar.

Ztschr. (1839), **1**, 122.
Type: *C. nobilis* Linn.

8. Calliphara nobilis Linn.

Cimex nobilis Linn., *Cent. Ins. Rar.* (1763), 17.
" " " id., *Amoen.* (1763), **6**, 400.
" " pustulatus Panz., *Voet. Coll.* (1798), **4**, 111, pl. 47, fig. 11.
Scutellera buquetii Guér., *Voy. Coq., Ins.* (1830), 159, 162.
Callidea nobilis Dall., *List. Hem.* (1851), **1**, 25.
Calliphara buquetii Stål, *Berl. Ent. Ztschr.* (1866), **10**, 153.
" " " id. *Ö. V. A. F.* (1870), 618.
" " nobilis id., *Enum. Hem.* (1873), **3**, 17.
" " " Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 53, fig. 23.
" " " (Subg. *Chrysophara*) Schout., *Gen. Ins., Het. Pent.* (1904), fasc. 24, p. 33, pl. 2, fig. 5.

Palawan, Mangahan and Iwahig, P. I., (11685 and 11706 *C. M. Weber.*), 3 specimens, the one from Iwahig being of a deep purple-blue.

9. Calliphara excellens Burm.

Tetyra excellens, Burm., *Nov. Act. Acad. Leop.* (1834), 16, Suppl. 1, 287, pl. 41, fig. 2.
Tectocoris obscura Westw., *Hope Cat.* (1837), **1**, 14.
Callidea nobilis Germ., *Ztschr.* (1839), **1**, 117.
" excellens Amy..et Serv., *Hém.* (1843), 32.
" praslinia Dall., *List Hem.* (1851), **1**, 24.
Calliphara excellens Stål, *Berl. Ent. Ztschr.* (1866), **10**, 153.
" " id. *Ö. V. A. F.* (1870), 618.
" " *Dist., Ann. Mag. Nat. Hist.* (1889) (7), **4**, 38.
" " id., *Fauna British Ind., Rhyn.* (1902), **1**, 53.
" " (Subg. *Chrysophara*) Schout., *Gen. Ins., Het. Pent.* (1904), fasc. 24, p. 32.

This is a somewhat variable species. It is common in most parts of the Philippines.

PALAWAN, Bacuit, P. I. (11649 *C. M. Weber*), 1 specimen.

CHRYSOCORIS Hahn.

Wanz. Ins. (1834), 2, 38.
Type: *C. dilaticollis* Guér.

10. CHRYSOCORIS GERMARI Esch.

Scutellera germari Esch., *Dorp. Abh.* (1822), 1, 156, pl. 2, fig. 1.
———————— — Guér., *Voy. Coq., Zool.* (1830), 2, 158.
Callidea ———— Burm., *Handb. d. Ent.* (1835), 2, 394.
———————— Herr.-Schäff., *Wanz. Ins.* (1836), 3, 102, pl. 106, fig. 327.
— ———— Germ., *Ztschr.* (1839), 1, 113.
— ———— Dall., *List. Hem.* (1851), 1, 27.
———— Voll., *Fauna Ind. Néerl.* (1863), 1, 36.
Chrysocoris ———— Stål, *Hem. Fabr.* (1868), 1, 11.
— — id., *Ö. V. A. F.* (1870), 618.
— id., *Enum. Hem.* (1873), 3, 20.

Specimens of this insect were identified by me in the British Museum, where I found those with red and those with green on the ventral surface of the abdomen, under the same label. I am not sure but that a careful study of the two forms will reveal specific differences, but for the present I have included specimens with green abdomen, collected in Palawan, under this specific name.

PALAWAN, Bacuit, and Iwahig, P. I., (11648 and 11704 *C. M. Weber*), 4 specimens in all.

COSCOMORIS Stål.

Hem. Afr. (1864), 1, 34.
Type: *C. sellatus* White.

11. **Cosmocoris distanti** sp. nov.

Broadly ovate, metallic indigo above with longitudinal and transverse brassy-green fasciæ, abdomen beneath ochraceous, basal and apical segments and legs indigo.

Head above and beneath (except at base) indigo, tylus and rectangular space between ocelli black. Eyes brown, ocelli ochraceous; antennæ uniformly dull black, except articulations which are brown, ochraceously pilose; rostrum uniformly brown, glabrous; pronotum indigo, with two submedian, longitudinal, anteriorly claviform, metallic green fasciæ on posterior two-thirds, diverging posteriorly, and a lateral, submarginal fascia of the same general shape but narrower. Posterior lateral angles slightly virescent externad to fascia. Scutellum with basal, callous elevation nearly black medially, obsoletely carinate posterior to callosity, remainder indigo; a sub-basal, transverse, metallic green fascia on each side just posterior to basal callosity; a broad transverse, brassy-green fascia, its anterior margin at middle of scutellum, its width equal to that of

basal callosity and its lateral margins not extending to lateral margin of scutellum; a brassy-green, transverse isosceles-triangular spot on subapical area.

Sternum and costal margins of tegmina indigo. Posterior margin of posternum, submedially and of mesosternum sublaterally, dull ochraceous as are coxæ and margins of stethi broadly.

Abdomen ventrally ochraceous, median area of second, third and posterior area of sixth and nearly all of first segment, except lateral extremities, indigo. Parastigmatal area irrorated with metallic brown. Posterior marginal area of genitalia metallic indigo.

Bases of all femora more or less ochraceous, the remainder of leg, including tarsi, indigo, tibiæ densely setose ventrally on apical half, and sulcate dorsally.

♂ exactly as ♀ except that only the basal third of the genitalia is ochraceous.

Length 13–14 millimeters; width of pronotum 7.5–8 millimeters.

Palawan, Bacuit, P. I., (*C. M. Weber,* collector).

Types of ♂ and ♀ No. 11652 in Entomological Collection, Bureau of Science, Manila, P. I.

Another pair, ♂ and ♀ labelled as paratypes. The ♀ of the paratype has only four segments in the right antenna, it being shorter than the left which is normal. The right apical segment is as long as the preapical, plus one-half the apical of the left antenna.

I take great pleasure in dedicating this strikingly beautiful insect to my friend, W. L. Distant, whose work with the Rhynchota needs no comment.

12. **Cosmocoris pulcherrimus** sp. nov. (Plate I, fig. 1.)

♀ dark blue, green, black and red. Head with basal area and tylus black, lateral lobes purplish blue, obsoletely transversely striate and punctuate; eyes and ocelli reddish brown; pronotum punctate, black and blue on posterior area and medially to anterior margin, irrorated at posterior lateral angles with metallic green and with two submedian, longitudinal blue fasciæ; anterior lateral areas, including margins and angles, vermilion, which color extends over propleuræ and to anterior margins of mesopleuræ; mesonotum black, opaque; basal fourth of scutellum vermilion, median half blue with a faint transverse metallic green, waved fascia medially; apical fourth broadly, lunately vermilion; basal lateral margins purplish blue, coarsely punctate or granulate; entire scutellum minutely punctate, the punctures being connected by microscopic lines on median apical area.

Dorsum of abdomen vermilion with a transverse black, lunate spot on last segment.

Ventral surface of head, thorax and basal abdominal segment dark

blue; stethi coxæ and basal halves of mid and posterior femora pale luteous; anterior femora pale luteous basally; remainder of legs and tarsi brown or blue-black and green, anterior femora being streaked with brown on basal area. Tibiæ apically strongly setose laterally and inferiorly. Second abdominal segment blue ventrally, two transverse, submedian vermilion spots on posterior margin; remainder of ventrum vermilion except a blue spot on basal, lateral angle of third and a black spot occupying median half of sixth. This spot is excavated with a vermilion spot on anterior margin medially. Genitalia brassy-green except on median area which is brown.

Antennæ black, thickly setose; three ultimate segments subequal in length; much less foliate than in *C. sellatus* White. Rostrum black, pilose; apices of second and third segments pale. Tegmina and wings fuliginous; costa of former dark blue.

Length 15 millimeters; width between pronotal angles 7.5 millimeters.

PALAWAN, Bacuit, P. I., (*C. M. Weber,* collector).

Type No. 11650 in Entomological Collection, Bureau of Science, Manila, P. I.

Three female specimens of this insect were taken. It is certainly one of the most beautiful of the Scutelleraria.

Two of the specimens collected by Weber and one imperfect specimen by Schultze at Iwahig (10912 *W. Schultze*) are labeled paratypes.

Distant does not separate this genus from *Chrysocoris,* though he gives the characters which differentiate it from the remainder of his genus;[3] while Schouteden makes it distinct in his monograph[4] of the family.

Subf. GRAPHOSOMATINÆ.

PODOPS Laporte.

Ess. Hém. (1832), 72.
Type: *C. inuncta* Fabr.

13. PODOPS SERRATA Voll.

Scotinophara serrata Voll., *Fauna Ind. Néerl.* (1863), 1, 43, pl. 3, fig. 9.
——————— - Stål, *Ö. V. A. F.* (1870), 7, 608 [ref.]
Podops —— —— —— Distant, *Fauna British Ind., Rhyn.* (1902), 1, 75.
—— —— —— —— Schouteden, *Gen. Insect., Het. Pent. Grapho.* (1905), 30, 135.

This species is recorded from Sikhim, Mungphu, Naga Hills, Burma, Malay Peninsula, Borneo, Celebes and previously from the Philippine Islands.

The Palawan specimen is slightly under the size indicated by Distant.

PALAWAN, Iwahig, P. I., (10911 *W. Schultze*).

[3] *Fauna British Ind., Rhyn.* (1902), 1, 56.
[4] *Gen. Insect., Het. Pent.* (1904), fasc. 24, pp. 16 and 37.

Subf. PENTATOMINÆ.

Div. HALYRIA.

DALPADA Amyot & Serville.

Hém. (1843), 105.
Type *D. aspersa* Amy. & Serv.

14. DALPADA TAGALICA Stål. (Plate II, fig. 9.)
Dalpada tagalica Stål, *Ö. V. A. F.* (1870), 622.

Although the members of this genus are scattered throughout the Malay region, but two species have so far been recorded from the Philippines, viz: *D. simplicipes* Stål, and the one here mentioned. All the species are showy insects easily captured. The specimens from Palawan, including 7 adults and 3 nymphs, were taken from the smaller branches of cacao trees (*Theobroma cacao* L.)

PALAWAN, Iwahig, P. I., (10910 *W. Schultze;* 11912 *C. M. Weber*) 15 specimens. Bacuit, P. I., (11656 *C. M. Weber*) 5 specimens.

Div. CARPOCORARIA.

TOLUMNIA Stål.

Ö. V. A. F. (1867), 515.
Type: *T. trinotata* Westw.

15. TOLUMNIA LONGIROSTRIS Dall. (Plate I, fig. 3.)
Tolumnia longirostris Dall., *List Hem* (1851), 1, 238.
—— ——— —— Stål, *Ö. V. A. F.* (1870), 7, 630.

A single specimen of this very characteristic species was taken. The femora of the specimen in hand are somewhat reddish yellow. In Dallas' specimen the fifth antennal segments were missing. In this specimen they are black with white bases, as are the fourth. This is evidently a rare insect.

PALAWAN, Iwahig, P. I., (10909 *W. Schultze*).

Div. EUSARCOCORIARIA.

EUSARCOCORIS Hahn.

Wanz. Ins. (1834), 2, 66.
Type: *E. æneus* Scop.

16. EUSARCOCORIS GUTTIGER Thunb.
Cimex guttigerus Thunb., *Nov. Ins. Sp.* (1783), 2, 32, Pl. 2, f. 47.
Pentatoma nepalensis et punctipes Westw., *Hope. Cat.* (1837), 1, 228.
Eysarcoris guttigerus Dall., *List Hem.* (1851), 1, 228.
Stollia guttigera Stål, *Enum. Hem.* (1876), 5, 81.
Eusarcocoris guttiger Dist., *Fauna British Ind., Rhyn.* (1902), 1, 165.

A single specimen of this species was taken.
PALAWAN, Iwahig, P. I., (11221 *W. Schultze*).

17. Eusarcocoris ventralis Westw.

Pentatoma ventralis Westw., *Hope Cat.* (1837), 1, 36.
Eysarcoris distactus Dall., *List Hem.* (1851), 1, 226.
Stollia distacta Atk., *J. A. S. B.* (1888), 57, 40.
———————— Stål, *Ö. V. A. F.* (1870), 628.
Eusarcocoris ventralis Dist., *Fauna British Ind., Rhyn.* (1902), 1, 167.

Of this species, which very closely resembles the preceding, except that the former has prominent pronotal angles and larger basal scutellar spots, 6 specimens were taken.

Palawan, Iwahig, P. I., (10906 *W. Schultze*).

18. Eusarcocoris bovillus Dall.

Eysarcoris bovillus Dall., *List Hem.* (1851), 1, 229.
Stollia bovilla Stål, *Ö. V. A. F.* (1870), 628.
———————— id., *Enum. Hem.* (1876), 5, 81.

This species was described originally from the Philippine Islands. It is by no means a common form.

Palawan, Bintuan, P. I., (11695 *C. M. Weber*), 2 specimens.

Div. HOPLISTODERARIA.

PARACRITHEUS Bergroth.

Rev. d' Ent. (1891), 10, 214.
Type: *P. trimaculatus* Lep. et Serv.

19. Paracritheus trimaculatus Lep. & Serv.

Paracritheus trimaculatus Lep. & Serv., *Enc. Méth.* (1825), 10, 411.
Graphosoma trimaculata Germ., *Ztschr.* (1839), 1, 54.
Hoplistodera ———————— Dall., *List Hem.* (1851), 1, 217.
Astyanax trimaculatus Stål, *Ö. V. A. F.* (1870), 629.
Paracritheus —— —— Dist., *Fauna British Ind., Rhyn.* (1902), 1, 178, fig. 106.

A single specimen of this easily recognizable species was taken in Palawan. It is reported from Burma, and many islands in the Malay Archipelago.

Palawan, Iwahig, P. I., (10907 *W. Schultze*).

Div. ANTESTIARIA.

PLAUTIA Stål.

Ö. V. A. F. (1867), 514.
Type: *P. fimbriata* Fabr.

20. Plautia viridicollis Westw.

Pentatoma viridicollis Westw., *Hope Cat.* (1837), 1, 35.
———————— inconspicua Dall., *List Hem.* (1851), 1, 250.
———————— viridicollis ibid., p. 251.
———————————— Stål, *Enum. Hem.* (1876), 5, 126 (among *spp. incert. loci. syst.*).
Plautia ———————— Dist., *Fauna British Ind., Rhyn.* (1902), 1, 182.

This species is so nearly like *P. fimbriata* Fabr., that, were it not for the size, I should place it unhesitatingly there. The differences given by Distant form so slight a characterization and the designations "scutellum with apical margin narrowly greyish" for *fimbriata* and "scutellum somewhat broadly greyish" for *viridicollis*, are characters which might easily vary greatly in individuals of the same species. I am inclined to believe that the two species will be united ultimately as *fimbriata*.

Palawan, Bacuit and Bintuan, P. I., (11653 and 11692 *C. M. Weber*), 1 specimen from each place.

ANTESTIA Stål.

Hem. Afr. (1864), **1**, 700.
Type: *A. maculata* Dall.

21. Antestia cruciata Fabr.

Cimex cruciatus Fabr., *Syst. Ent.* (1775), 714.
Pentatoma pantherina Westw., *Hope Cat.* (1837), **1**, 34.
Pentatoma cruciata Amy et Serv., *Hém.* (1843), 132.
Strachia geometrica Motsch., *Bul. Soc. Nat. Mosc.* (1863), **36**, pt. 2, 75.
—— —— ——— Nietn., *Enem. of Coffee Tree* (1864), 8.
——— velata Walk., *Cat. Het.* (1867), **2**, 329.
——— sulacta Walk., *ibid.*
Antestia cruciatia Stål, *Ö. V. A. F.* (1870) 630.
——————— Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 185.

This species has been taken in Manila and at Baguio, Benguet. Eleven specimens were taken in Palawan. It is distributed quite generally over the Malay region. In Manila it was found breeding on imported olive trees at the agricultural experiment station.

Palawan, Iwahig, P. I., (10905 *W. Schultze*), 11 specimens.

APINES Dallas.

List Hem. (1851), **1**, 232.
Type: *A. concinna* Dall.

22. **Apines grisea** sp. nov. (Plate II, fig. 5.)

Grey and black, shining, coarsely punctate above, more finely beneath; head black, anterior area of scutellum broadly black; discal area of pronotum creamy white with its posterior portion and a narrow median area punctured with black; posterior lateral lobes of pronotum, lateral margins to base and apex of scutellum creamy white, black punctured except apex of scutellum. Base of corium grey, punctured with black; apical fourth black, preceded by a transverse, white callosity; membrane dark brown, pale at tips of tegmina.

Body beneath black, shining, punctate; pro-, meso- and metastethi, coxæ, femora (except apical fourth which is black), submedian rectangular patches on first to fourth abdominal segments, and lateral margins of metapleuræ and of all abdominal segments creamy white; sutures black. Anterior tibiæ black, mid and posterior creamy white, with black bases

and apices; tarsi black; antennæ black except first and base of second segments which are obscurely, creamy white; basal half of rostrum pale, distal half black.

Length 5.5 to 6.5 millimeters.

PALAWAN, Iwahig, P. I., (10903 *W. Schultze*) and Manila, P. I., (9984 *Guerrero.*)

Type No. 10903 in Entomological Collection, Bureau of Science, Manila, P. I.

There are but two specimens of this interesting species in the collection. The one from Manila is the smaller of the two but otherwise the specimens are identical in appearance.

Div. NEZARIA.

CATACANTHUS Spinola.

Ess. (1837), 352.
Type: *C. incarnatus* Dru.

23. CATACANTHUS NIGRIPES Sulz.
Cimex nigripes Sulz., *Gesch. Ins.* (1776), 96, pl. 10, fig. 9.
— — punctum Fabr., *Ent. Syst.* (1794), 4, 105, 100.
Edessa ——— Fabr., *Syst. Rhyn.* (1803), 149, 16.
Raphigaster carrenoi Le Guill., *Rev. Zool.* (1841), 4, 262, 9.
——————————— Stoll, *Les Pun.* (1788–90), 29, pl. 6, fig. 40.
Catacanthus nigripes Dall., *List Hem.* (1851), 1, 271.
Pentatoma tricolor Montr., *An. Sci. Phys. et Nat.* (1855), (2), 7, 96.
Catacanthus tricolor Stål, *Ö. V. A. F.* (1870), 631.

This species, of lengthy synonymy, is undoubtedly the species described by Sulz in 1776 as shown by my researches in the British Museum.

It has been recorded previously from other parts of the Philippines, having been collected by Cuming and Semper and on Fuga Island (626 *McGregor*) on Romblon (1975 *McGregor*), at Manila (7356 *R. Parás*), at Lamao (7623 *Cuzner*), on Camaguin Island (7888 *McGregor*).

PALAWAN, Iwahig, P. I., (10904 *W. Schultze*), 5 specimens in good color. Captured in dense forest in flight. Bacuit, P. I., (11651 *C. M. Weber*), 1 specimen.

NEZARA Amyot et Serville.

Hém. (1843), 143.
Type: N. *viridula* Linn.

24. NEZARA ANTENNATA Scott, Ann. Mag. Nat. Hist. (1874), (4), 14, 299.
var. Nezara icterica Horv., *Természz. Füzetek.* (1887), 12, 31.
var. ——— balteata Horv., *loc. cit.*
Nezara antennata, Distant, *Fauna British Ind., Rhyn.* (1902), 1, 220.

A single specimen, which agrees perfectly with Scott's description, save in the absence of the black spot on the genæ. The extreme tip of the fifth antennal segment is pale.

Recorded also from the Himalayas, China, Japan.

PALAWAN, Iwahig, P. I., (10908 *W. Schultze*).

Subf. TESSARATOMINIÆ.

Div. EUSTHENARIA.

PYCANUM Amyot & Serville.

Hem. (1843), 171.
Type: *P. rubens* Fabr.

25. PYCANUM RUBENS Fabr.

Cimex rubens Fabr., *Ent. Syst.* (1794), 4, 107.
——— amethystinus Weber, *Obs. Ent.* (1801), 115.
Edessa amethystina Fabr., *Syst. Rhyng.* (1803), 150.
Tessaratoma alternata Lepel. et Serv., *Encyc. Méth.* (1825), 10, 591.
Aspongopus amethystinus Burm., *Handb. d. Ent.* (1835), 2, 351.
——————————— Herr.-Schäff., *Wanz. Ins.* (1839), 4, 85, pl. 135, fig. 417.
Dinidor amethystinus Herr.-Schäff., *ibid.* (1844), 7, 76.
Pycanum amethystinum Dall., *List Hem.* (1851), 1, 345.
——————— rubens Stål, *Hem. Fabr.* (1868), 1, 40.
——————————— Dist., *Fauna British Ind., Rhyn.* (1902),1, 274, fig. 174.

This beautiful insect has not been reported from the Philippines previously, though Stål describes a species closely related to it.

PALAWAN, Bacuit, P. I., (11647 *C. M. Weber*). A single perfect specimen, almost entirely suffused with green, with some purplish brown showing on the bases of the tegmina.

Div. EUMENOTARIA.

EUMENOTES Westwood.

Tr. Ent. Soc. (1847), 4, 246.
Type: *E. obscura* Westw.

26. EUMENOTES OBSCURA Westw. (Plate II, fig. 4, *a*.)

Eumenotes obscura Westw., *Tr. Ent. Soc.* (1847), 4, 247, pl. 18, fig. 4.
——— ——————— Voll., *Fauna Ind. Néerl.* (1868), 3, 49.
Odonia truncata Stål, *Ö. V. A. F.* (1870), 645.
Aradus truncatus Walk., *Cat. Het.* (1873), 39.
Odonia truncata Bergr., *Ann. Mus. Civ. Gen.* (1889), 27, 733, pl. 12, fig. 4.
——————————— Stål, *Enum. Hem.* (1870), 1, 89.
——— ——————— Dist., *Fauna British Ind., Rhyn.* (1904), 2, 155, fig. 114.
——— — ——— ibid., *Ann. Mag. Nat. Hist.* (1903) (7), 12, 476.

PALAWAN, Mangahan Swamp near Iwahig, P. I., (11687 *C. M. Weber*). A single perfect specimen.

This by no means common species is here added to our collection for the first time. It would appear that Distant's figure gives an incorrect idea of the venation of the membrane. Westwood represents the veins as reticulated and my specimen agrees with Westwood's figure in this.

Very great confusion seems to have existed as to the family position of this genus. I must confess that a cursory examination would lead

one to place it among the Aradidæ, but Bergroth[5] has given the whole subject a most careful study and has again placed the genus in its proper position among the Tessaratominæ, creating a new division for it.

I have examined most scrupulously the single specimen in our collection and find the ocelli very conspicous. This feature alone would take the genus out of Aradidæ.

A notable feature of the specimen collected in Palawan is the possession of a tri-articulate right antenna, that on the left being normal. I have endeavored to give the exact features in the drawing, as a satisfactory illustration of this insect has not yet appeared.

Subf. Dinidorinæ.

MEGYMENUM Laporte.

Ess. Hém. (1832), 52.
Type: *M. dentatum* Boisd.

27. Megymenum subpurpurascens Westw.

Platydius subpurpurascens Westw., *Zool. Journ.* (1834), **5**, 446, pl. 22, fig. 8.
Megymenum cupreum Guér., *Voy. Coq., Zool. Ins.* (1838), **2**, pt. 2, 172.
Amaurus cupreus Herr.-Schäff., *Wanz. Ins.* (1839), **5**, 61, fig. 503.
Megymenum meratii Le Gillou, *Rev. Zool.* (1841), 261.
——————— subpurpurascens Stål, *Enum. Hem.* (1870), **1**, 87.
— — ——————— Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 287.

This species has been taken in other parts of the Philippines, including the Islands of Ticao and Negros and at Manila.

Palawan, Mangahan Swamp, near Iwahig, P. I., (11682 *C. M. Weber*), 1 specimen.

Also taken as follows: Manila (3477 *Banks*, 5987 *J. A. Gilkerson*); Negros Occidental, Bago, P. I., (6644 *Banks*) and Ticao Island, (9623 *R. C. McGregor*).

Subf. Coreinæ.

Div. PETASCELARIA.

PETILLIA Stål.

Hem. Afr. (1865), **2**, 2.
Type: *P. tragus* Fabr.

28. Petillia calcar Dall.

Mictis calcar Dall., *List. Hem.* (1852), **2**, 397.
Trematocoris subvittata Walk., *Cat. Het.* (1871), **4**, 34.
— ——— vittata *ibid.* p. 36.
Melucha notatipes *ibid.* p. 56, immature form.
Petillia calcar Dist., *Ann. Mag. Nat. Hist.* (1900) (7), **6**, 376.
— ——— id., *Fauna British Ind., Rhyn.* (1902), **1**, 351.

[5] *Deutsch. Ent. Ztschr.* (1907), 498 *et seq.*

PALAWAN, Iwahig, P. I., (11901 *C. M. Weber*). A single specimen. The basal dentations of the tibiæ are not very prominent in this specimen, otherwise it agrees with the description.

Div. HOMŒOCERARIA.

HOMŒOCERUS Burmeister.

Handb. d. Ent. (1833), 2, pt. 1, 316.
Type: *H. puncticornis* Burm.

29. HOMŒOCERUS IMMACULATUS Stål, *Ö V. A. F.* (1870), 650.
Homœocerus immaculatus id. *Enum. Hem.* (1873), 3, 62.

This species, collected previously by me in other parts of the Philippines and originally described by Stål from these Islands, is represented in the Palawan collection by a single specimen.

PALAWAN, Iwahig, P. I., (10945 *W. Schultze*).

30. HOMŒOCERUS sp.

A single specimen of an apparently new species was taken, but the material is considered as insufficient to warrant describing it as new, especially as considerable variation exists in the same species of this large genus.

PALAWAN, Iwahig, P. I., (10868 *W. Schultze*), 1 specimen.

31. HOMŒOCERUS sp.

Like the above, only a single specimen, mutilated as to the antennæ, but otherwise perfect.

PALAWAN, Iwahig, P. I., (10950 *W. Schultze*).

Div. CLORESMARIA.

NOTOBITUS Stål.

Ö. V. A. F. (1859), 451.
Type: *N. meleagris* Fabr.

32. NOTOBITUS AFFINIS Dall.
Nematopus affinis Dall., *List Hem.* (1852),2, 423.
Notobitus ——— Stål, *Ö. V. A. F.* (1870), 648.
—— ——— Dist., *Fauna British Ind., Rhyn.* (1902), 1, 372.

This species was originally described from the Philippines and has been collected in various parts by me.

PALAWAN, Iwahig, P. I., (10900 *W. Schultze*), 9 specimens. Iwahig, P. I., (11909 and 11978 *C. M. Weber*), 2 specimens.

Div. ANISOSCELARIA.

LEPTOGLOSSUS Guérin.

Voy. Coq., Zool. (1830), **2**, pt. 2, 174.
Type: *L. dilaticollis* Guér.

33. Leptoglossus membranaceus Fabr.

Cimex membranaceus Fabr., *Spec. Ins.* (1781), 351.
Lygæus ——————— Fabr., *Ent. Syst.* (1794), 4, 139.
Anisoscelis ——————— Burm., *Handb.* (1835), **2**, 332.
Cimex mormodicæ Forst., *Descr. An.* (1844), 16.
Anisoscelis orientalis Dall., *List Hem.* (1852), **2**, 454.
——— flavopunctatus Sign., *in Maillard, Notes sur l'île de la Réun., Annexe J.* (1863), **27**, pl. 21, fig. 4.
Leptoglossus membranaceus Stål, *Ö. V. A. F.* (1870), 648.
— — — — — — id., *Enum. Hem.* (1873), **3**, 68.
Anisomelis orientalis Kirby, *J. Linn. Soc. Zool.* (1891), **24**, 92.
Leptoglossus membranaceus Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 382, fig. 224.

Recorded from Africa, Ceylon, Malay Archipelago to Australia, and common in all parts of the Philippines.

Palawan, Iwahig, P. I., (10935 *W. Schultze*), 2 specimens; Iwahig, P. I., (11911 *C. M. Weber*), 3 specimens.

Div. PHYSOMERARIA.

PHYSOMERUS Burmeister.

Handb. d. Ent. (1835), **2**, 341.
Type: *P. grossipes* Fabr.

34. Physomerus grossipes Fabr.

Lygæus grossipes Fabr., *Ent. Syst.* (1794), **4**, 135.
——— calcar Fabr., *Syst. Rhyng.* (1803), 241.
Coreus (Cerbus) œdymerus Burm., *Nov. Act. Ac. Leop.* (1834), **16**, Supp. p. 296.
Physomerus calcar Herr.-Schäff., *Wanz. Ins.* (1842), **6**, 60, fig. 621.
——————— œdymerus Dall., *List Hem.* (1852), **2**, 213.
——————— grossipes Stal, *Hem. Fabr.* (1868), **1**, 45.
——————— calcar ibid.
——————— œdymerus Stål, *Ö. V. A. F.* (1870), 648.
——————— delineatus Walk., *Cat. Het.* (1871), 4, 59.
——————— grossipes Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 383, fig. 225.

A very common species throughout this region. Abundant in all parts of the Philippines. Found in great numbers breeding on *Ipomoea cairica* Sweet. The eggs are laid in regular patches upon fences or piazzas, where this vine grows, especially on bamboo lattices.

Palawan, Bacuit, P. I., (11659 *C. M. Weber*), 8 specimens.

ACANTHOCORIS Amyot & Serville.

Hém. (1843), 43.
Type: *A. scabrator* Fabr.

35. ACANTHOCORIS SCABRATOR Fabr.
Coreus scabrator Fabr., *Syst. Rhyng.* (1803), 195.
Crinocerus ——— Burm., *Handb.* (1835), **2**, 319.
——————— scabripes Herr.-Sch., *Wanz. Ins.* (1842), **6**, 18, fig. 574.
Acanthocoris scabrator Amy. et Serv., *Hém.* (1843), 214.
— - ——————— —— Dall., *List Hem.* (1852), **2**, 215.
——— ——————— Stål, *Hem. Fabr.* (1868), **1**, 45.
— - - —— ——— Stål, *Enum. Hem.* (1873), **3**, 71.
- —— —— ———— Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 385, fig. 226.

A species recorded from India and "also found on many islands of the Malay Archipelago." Collected in all parts of the Philippines; very common.

PALAWAN, Iwahig, P. I., (10936 *W. Schultze*), 2 specimens.

Div. GONOCERARIA.

CLETUS Stål.

Freg. Eug. Resa, Ins., Hem. (1859) 236.
Type: *C. trigonus* Thunb.

36. CLETUS TRIGONUS Thunb.
Cimex trigonus Thunb., *Nov. Ins. Sp.* (1783), **2**, 37.
——— pugnator Fabr., *Mant. Ins.* (1787), **2**, 287.
Gonocerus acutus Dall., *List Hem.* (1852), **2**, 495.
Cletus trigonus Stål, *Freg. Eug., Resa, Ins., Hem.* (1859), 237.
—— bistillatus Dohrn, *Stett. Ent. Zeit.* (1860), **21**, 403.
Cletus pugnator Stål, *Hem. Fabr.* (1868), **1**, 60.
——— acutus Stål, *Ö. V. A. F.* (1870), 652.
——— trigonus Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 394.

This insect, which was previously recorded from the Philippines by Stål in 1859, is very abundant in the vicinity of Manila (487, 5368 *Banks*) and in the province of Tarlac (383 *Fernandez*).

PALAWAN, Iwahig, P. I., (10917 *W. Schultze*) 4 specimens. Tara Island, P. I., (11723 *C. M. Weber*), 1 specimen.

Subf. ALYDINÆ.

Div. MICRELYTRARIA.

STACHYOLOBUS Stål.

Ö. V. A. F. (1870), 658.
Type: *S. macilentus* Stål.

37. STACHYOLOBUS MACILENTUS Stål, *Ö. V. A. F.* (1870), 659. (Plate 7, fig. 4.)
Stachyolobus macilentus Stål, *Enum. Hem.* (1873), **3**, 89.

This species, of which but the single specimen here mentioned is in our collection, was originally described from the Philippines by Stål.

PALAWAN, Iwahig, P. I., (10919 *W. Schultze*). A single delapidated specimen.

Div. LEPTOCORISARIA.

LEPTOCORISA Latreille.

Fam. Nat. (1825), 421.
Type: *L. tipuloides* De Geer.

38. LEPTOCORISA ACUTA Thunb.

Cimex acutus Thunb., *Nov. Ins. Sp.* (1783), **2**, 34.
——— angustatus Fabr., *Mant. Ins.* (1787), **2**, 308.
——————— Gmel., *Syst. Nat.* (1788) (1), **4**, 2193.
Gerris oratorius Fabr., *Ent. Syst.* (1794), **4**, 191.
Leptocorisa bengalensis Westw., *Hope Cat.* (1842), **2**, 18.
Rhabdocoris arcuata Kolenati, *Melet. Ent.* (1845), **2**, 68.
Myodochus trinotatus Herr.-Schäff., *Wanz. Ins.* (1848), **8**, 95, fig. 863.
Leptocorisa maculiventris Dall., *List Hem.* (1852), **2**, 484.
Gerris angustatus Stål, *Hem. Fabr.* (1868), **1**, 66.
——————— Stal, *Ö. V. A. F.* (1870), 658.
Leptocorisa acuta Dist., *P. Z. S.* (1901), **1**, 331.
——————— — Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 410.

Reported from China, Java, Celebes, Gilolo and previously from the Philippines.

In the Philippine Islands this species is very destructive to rice "in the milk." It may be found in all stages of growth in the rice fields. The insect is known in Visayan as *tiañja*. Its odor is decidedly offensive. The adults are quick fliers and are constantly on the alert so that their capture is affected with some difficulty.

PALAWAN, Iwahig, P. I., (10918 *W. Schultze*), 14 specimens.

Div. ALYDARIA.

RIPTORTUS Stål.

Ö. V. A. F. (1859) 460.
Type: *R. dentipes* Fabr.

39. RIPTORTUS LINEARIS Fabr.

Lygæus linearis Fabr., *Syst. Ent.* (1775), 710.
Alydus dentipes Herr.-Schäff., *Wanz. Ins.* (1848), **8**, 99, fig. 867.
——————— clavatus Dohrn, *Stett. Ent. Zeitung* (1860), **21**, 402.
Riptortus linearis Stål, *Hem. Fabr.* (1868), **1**, 64.
——————— Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 415.

The specimen from Tara Island is evidently a pale form in which the darker markings are almost obsolete.

PALAWAN, Tara Island, P. I., (11718 *C. M. Weber*). A single specimen.

MARCIUS Stål.

Hem. Afr. (1865), **2**, 7.
Type: *M. generosus* Stål.

40. MARCIUS QUINQUESPINUS Stål. (Plate II, fig. 6.)

Marcius quinquespinus Stål, *Ö. V. A. F.* (1870), 657.
——— — - - Stål, *Enum. Hem.* (1873), **3**, 89.

This species was described originally from the Philippines by Stål. Only 2 specimens were taken by Schultze, though he says the species is common at Iwahig. The male is somewhat smaller than the female.

PALAWAN, Iwahig, P. I., (10914 *W. Schultze*).

Subf. CORIZINÆ.

Div. CORIZARIA.

CORIZUS Fallen.

Spec. Nov. Hem. Disp. Meth. Exhib. (1814), 8.
Type: *C. crassicornis* Linn.

41. CORIZUS HYALINUS Fabr.

Lygæus hyalinus Fabr., *Ent. Syst.* (1794), **4**, 168.
Coreus ———— Fabr., *Syst. Rhyng.* (1803), 201.
Corizus gracilis Sign., *Ann. Soc. Ent. Fr.* (1859) (3), **7**, 88.
——— dilatipennis Sign., *ibid.* p. 89, No. 18.
——— variegatus Sign., *ibid.* p. 89, No. 20.
——— siculus Sign., *ibid.* p. 91, No. 24.
Rhopalus truncatus (Ramb.) Fieb., *Eur. Hem.* (1861), 234.
Corizus ———— Stål, *Hem. Afr.* (1865), **2**, 117.
——— (Liorhyssus) hyalinus Stål, *Enum. Hem.* (1870), **1**, 222.
——— hyalinus Stål, *Ö. V. A. F.* (1870), 659.
——— ——— Hambleton, *Ann. Ent. Soc. Am.* (1908), **1**, 136.

Signoret gives the best description of this species, under *C. gracilis*, while Stål shows that Signoret's other species, given as distinct in his monograph of the genus, as above, are synonymous with *C. hyalinus*.

It is recorded as follows: *Americæ insulis*, Cape of Good Hope, Egypt, Nubia, middle Europe, America and New Holland. It was recorded previously from the Philippines by Stål.

PALAWAN, Iwahig, P. I., (10915 *W. Schultze*). Four specimens.

Div. SERINETHARIA.

SERINETHA Spinola.

Ess. (1837), 247.
Type: *S. abdominalis* Fabr.

42. SERINETHA ABDOMINALIS Fabr.

Lygæus auger Fabr., *Ent. Syst.* (1794), **4**, 161, [part.]
——— abdominalis Fabr., *Syst. Rhyng.* (1803), 226.
Leptocoris rufus Hahn., *Wanz. Ins.* (1831), **1**, 201, fig. 102.
——— abdominalis Burm., *Handb.* (1835), **2**, 305.
Lygæomorphus ———— Blanch., *Hist. des Ins.* (1840), **3**, 116.
Pyrrhotes ———— Westw., *Hope Cat.* (1842), **2**, 26.
Serinetha taprobanensis Dall., *List Hem.* (1852), **2**, 461.
——— abdominalis Stål, *Hem. Fabr.* (1868), **1**, 68.
Leptocoris ———— *id.*, *Ö. V. A. F.* (1870), 659.
Serinetha ———— *id.*, *Enum. Hem.* (1873), **3**, 99.
Leptocoris bahram Kirkaldy, *Bull. Liverp. Mus.* (1899), **2**, 46.
Serinetha abdominalis Dist., *Fauna British Ind., Rhyn.* (1902), **1**, 419 fig. 246.

Although this species is recorded from the Philippines by several authors, it has never been brought to this laboratory before. It bears a strong superficial resemblance to *Antilochus nigripes* Burm., of the family Pyrrhocoridæ.

PALAWAN, Iwahig, P. I., (11933 *C. M. Weber*). A single specimen.

Fam. LYGÆIDÆ.

Subf. LYGÆINÆ.

Div. LYGÆARIA.

SCOPIASTES Stål.

Enum. Hem. (1874), 4, 98.
Type: *S. degeeri* Stål.

43. **Scopiastes ruficollis** sp. nov. (Plate II, fig. 2.)

General color cupreous brown, anterior two-thirds of pronotum coralline, as are meso- and metapleuræ. Head black; basal half of first antennal segment dark coralline, remainder of antennæ black, pubescent, second and third segments equal, fourth one-half longer than third and slightly incrassate. Ocelli brown-red, entire prothorax, except a posterior dorsal triangular brown-red portion, bright coral red, scutellum æneous as also corium and posterior portion of abdomen. Connexivum and disc of ventral surface stramineous; meso- and metasterna brown as also a lateral abdominal fascia ventrad. Last abdominal segment dark brown, entire ventrum glabrous, pubescent. Femora dark brown apically, pale yellowish brown basally. Remainder of legs dark brown. Membrane of elytra and wings uniformly fuscous.

Length 5.5 millimeters, width 1.5 millimeter.

PALAWAN, Iwahig, P. I. (*W. Schultze*, collector).

Type No. 10947 in Entomological Collection, Bureau of Science, Manila, P. I.

Described from a single specimen in perfect condition.

ONCOPELTUS Stål.

Hem. Fabr. (1868), 1, 75.
Type: *O. famelicus* Fabr.

44. ONCOPELTUS NIGRICEPS Dall.

Lygæus nigriceps Dall., *List. Hem.* (1852), 2, 537.
" " Stål, *Enum. Hem.* (1874), 4, 119.
" " Leth. & Serv., *Cat. Gén. Hém.* (1894), 2, 157.
Oncopeltus nigriceps id., *tom. cit.* p. 137.
" " Dist., *Fauna British Ind., Rhyn.* (1904), 2, 4, fig. 2.

This species is here recorded from the Philippines for the first time. It was described from India. The specimens at hand show a light variety in which the basal, angular pronotal spots in the typical form are extended transversely to form a fascia on its posterior border.

PALAWAN, Bacuit, P. I. (11661 *C. M. Weber*). Two specimens in both of which the abdomen is badly shrunken.

LYGÆUS Fabricius.

Ent. Syst. (1794), 4, 133 *pro parte.*
Type: *L. militaris* Fabr.

45. LYGÆUS HOSPES Fabr.

Lygæus hospes Fabr., *Ent. Syst.* (1794), 4, 150.
——— affinis Wolff., *Icon.* (1802), 3, 110, fig. 104.
——— hospes Fabr., *Syst. Rhyng.* (1803), 219.
——— lanio Herr-Schäff., *Wanz. Ins.* (1844), 7, 21, fig. 705.
——— squalidus Montr. & Sign., *Ann. Soc. Ent. Fr.* (1861) (4), 1, 66.
——— hospes Stål, *Hem. Afr.* (1865), 2, 136, foot note.
——— ——— var. familiaris Fabr., *Species Ins.* (1781), 2, 363.
——— ——— ——— ——— Stål, *Ö. V. A. F.* (1870), 609.
——— ——— ——— Dist., *Fauna British, Ind., Rhyn.* (1904), 2, 6, fig. 3.

This species has been reported from the Philippines previously, under the varietal name of *familiaris.*

PALAWAN, Bacuit, P. I., (11665 *C. M. Weber*), 1 specimen.

GRAPTOSTETHUS Stål.

Hem. Fabr. (1868), 1, 73.
Type: *G. servus* Fabr.

46. GRAPTOSTETHUS SERVUS Fabr.

Cimex servus Fabr., *Mant. Ins.* (1787), 2, 300.
Lygæus ——— Fabr., *Ent. Syst.* (1797), 4, 156.
——— ——— var. maculicollis Germ., *Fauna Ins. Europ.* (1817), 24.
——— incomptus Herr-Sch., *Wanz. Ins.* (1848), 8, 104, fig. 875 et (1853), 9, 196.
——— manillensis Stål, *Freg. Eug. Resa, Ins.* (1859), 240.
——— ornatus Uhler, *Proc. Ac. N. S. Philad.* (1860), 227.
——— (Graptostethus) servus Stål, *Hem. Fabr.* (1868), 1, 74.
——— (Graptostethus) servus et manillensis Stål, *Ö. V. A. F.* (1870), 660.
——— inaequalis Walk., *Cat. Het.* (1872), 5, 57.
——— servus vars. nigriceps et manillensis Stål, *Enum. Hem.* (1874), 4, 117.
——— ——— ——— Dist., *Ann. Mag. Nat. Hist.* (1901) (7), 7, 537.
Graptostethus ——— Dist., *Fauna British Ind., Rhyn.* (1904), 2, 8, fig. 4.

This species, much confused in the synonymy, is distributed throughout the Malay and Australian regions, China, the southern Palæartic region, South Africa and Madagascar, and it is extremely variable. Specimens from the Philippines exhibit all possible gradations from nearly wholly red to nearly wholly back. The prothoracic markings are very diverse in a series from Manila.

PALAWAN, Iwahig, P. I., (10916 *W. Schultze*), 9 specimens; Bacuit, P. I., (11658 *C. M. Weber*), 2 specimens.

Subf. COLOBATHRISTINÆ.

MALCUS Stål.

Freg. Eug. Resa, Ins., Hem. (1859), 241.
Type: *M. flavidipes* Stål.

47. MALCUS FLAVIDIPES Stål, *Freg. Eug. Resa, Ins., Hem.* (1859), 242, pl. 3, fig. 2.
Malcus flavidipes Distant, *Fauna British Ind., Rhyn.* (1904), **2**, 33, fig. 22.

This well-marked little insect, though collected by me previously in the vicinity of Manila, has never been recorded before from the Philippines. It was originally described from Java.

PALAWAN, Iwahig, P. I., (10951 *W. Schultze*); RIZAL, Montalban, P. I., (5402 *Banks*). Schultze took a single specimen.

Subf. HETEROGASTRINÆ.

CHAULIOPS Scott.

Ann. Mag. Nat. Hist. (1874), (4) **14**, 427.
Type: *C. fallax* Scott.

48. **Chauliops bisontula** sp. nov. (Plate I, fig. 4, *a*.)

Pale yellowish brown, uniformly and deeply punctured, each puncture containing a pale, scale-like, appressed hair. Head vertically deflected, brown, densely pilose, especially internad to each eye, where the scale-like hairs form a pale ochraceous patch. Ocelli dark red-brown, the area surrounding them less pilose; first antennal segment luteous, second pale fuscous on basal half, paler apically; third and fourth entirely pale fuscous, the latter with minute whitish pubescence. Rostrum fuscous, piceous at apex; infraocular spine piceous. Pronotum strongly deflected anteriorly, brown, ochraceously irrorated, and with coarse punctures evenly placed; a triangular pilose area near anterior margin medially; posterior angles slightly tumescent, subglabrous. Scutellum dark brown with thick pile on lateral margins from base to near apex, which latter is elevated, nearly black and sulcate. Corium concolorous with pronotum; clavus with a single longitudinal row of piliferous punctures. Membrane translucent white; its extreme length equal to that of pronotum and scutellum. Connexivum strongly, lobately reflected; margins of lobes piceous. Ventral surface of thorax and abdomen concolorous with pronotum, and with regular piliferous punctation in addition to pilose areas irregularly placed. Legs entirely pale translucently ochraceous.

Length 2 millimeters; width 1 millimeter.

PALAWAN, Tara Island, P. I., (*C. M. Weber*, collector.)

Type No. 11801 in Entomological Collection, Bureau of Science, Manila, P. I.

A single specimen in which the right mid leg and the left hind leg are missing, otherwise perfect. A profile view presents a striking likeness to a miniature bison.

Subf. PACHYGRONTHINÆ.

PACHYGRONTHA Germar.

Silb. Rev. Ent. (1837), 5,152.
Type: *P. lineata* Germ.

49. **Pachygrontha bicornuta** sp. nov. (Plate I, fig. 5, *a*.)

♀ ochraceous to sordid white, varnished, thickly, darkly punctate; punctation extending to median dorsal area of first four abdominal segments (covered by wings and elytra). Head, including lateral lobes, two-thirds as wide as long; regularly punctate, a recurved, dark sulcus extending from base of eyes to ocelli, thence slightly anteriad; lateral lobes strongly carinate and directed forward and downward, terminating acutely. Lower surface of head and thorax in ♀ pitchy brown; pronotum nearly one-fourth longer than broad at base, anterior margin slightly concave, lateral margins straight; posterior margin obscurely sinuate, posterior lateral angles dark brown as is posterior margin, except a pale hairline exactly on margin; a ferrugineous, slightly elevated lunate area on each side of the anterior half of pronotum, these separated by a pale median line. Scutellum dark at base with levigate carina from before middle to apex, which is pale and acute; an obsolescent, pale levigate spot between anterior termination of carina and basal angle.

Corium pale ochraceous, darker on inner margin; a piceous fascia broadening from near base to middle of apical margin where a darker spot occurs, as also a minute spot at apical angle; membrane fuliginous; veins and vein areas much paler.

Disc of third and fourth abdominal segments dorsally and ventrally ochraceous, the dorsal sparsely brown, punctate; all dorsal segments minutely transversely striate, connexivum stramineous, with pale, rufous, longitudinal line dorsally, and darker stigmata ventrally. Ventral surface of abdomen except as indicated above and except inner margin of fifth segment, black; legs pale ochraceous; femora and tibiæ punctate; anterior femora black beneath and densely punctate above; spines pale, black at apices. Antennæ one-sixth longer than body; first segment equal to third and fourth together, dark ochraceous, black at apex; second and third darker, apical half of third, pale stramineous; fourth piceous.

Length 9 millimeters; width 2 millimeters.

♂ differs from ♀ in being paler dorsally and ventrally, both surfaces of abdomen reddish ochraceous; anterior femora and all coxæ concolorous

with abdomen; third and fourth ventral segments of abdomen medially paler; dorsal abdominal punctation very sparse.

First segment of antennæ one and a half times length of the corresponding ♀ segment and nearly as long as second and third together; apical half of third and whole of fourth, pale stramineous; apex of first brown. Total length of antenna one and five-sevenths that of body.

Length 9 millimeters; width 2 millimeters.

PALAWAN, Iwahig, P. I., (*W. Schultze,* collector).

Types ♂ and ♀ No. 10866 in Entomological Collection, Bureau of Science, Manila, P. I.

In the type ♂ the right antenna is partially destroyed. Three other specimens of ♀'s bearing the same number as the types are in this collection. They measure 7.5 millimeters in length and 1.5 millimeter in width, but otherwise are identical with the types; they are labelled paratypes.

Subf. APHANINÆ.

Div. MYODOCHARIA.

PAMERA Say.

New Horm. Ind. (1831), 777.
Type: *P. vincta* Say.

50. PAMERA NIETNERI Dohrn.

Plociomerus nietneri Dohrn, *Stett. Ent. Zeit.* (1860), **21**, 404.
Plociomera ——— Stål, *Ö. V. A. F.* (1870), 663.
Pamera ——— Stål, *Enum. Hem.* (1874), **4**, 151.
— — — — Distant, *Fauna British Ind., Rhyn.* (1904), **2**, 53.

Described from Ceylon and found also in India. Reported by Stål from the Philippines. It occurs in all parts of these Islands where I have collected.

PALAWAN, Iwahig, P. I., (10863 *W. Schultze*). A single specimen.

51. PAMERA VINCTA Say, *New Harm. Ind.* (1833).

Pamera Vincta Say, *Compl. Writings* (1859), **1**, 333.
Lygæus (Plociomerus) amyotii Guér., *Sagra, Hist. de Cuba, Ins.* (1857), 400.
Rhyparochromus gutta Dall., *List. Hem.* (1852), **2**, 573.
——— parvulus Dall., *ibid.* p. 576.
——— vinulus Stål, *Freg. Eug. Resa, Ins., Hem.* (1859), 246.
Plociomera parvula, var. *a.* Stål, *Hem. Afr.* (1865), **2**, 159.
Ligyrocoris bipunctatus Kirby, *J. Linn. Soc., Zool.* (1890), **20**, 547.
Pamera vincta Dist., *Ann. Mag. Nat. Hist.* (1901) (7), **8**, 480.
——— Distant, *Fauna British Ind., Rhyn.* (1904), **2**, 52.

This species, which is spread over the entire tropics and subtropics, has not been recorded previously from the Philippines.

PALAWAN, Iwahig, P. I., (10953 *W. Schultze*), 3 specimens.

Div. APHANARIA.

DIEUCHES Dohrn.

Stett. Ent. Zeit. (1860), **21**, 159.
Type: *D. syriacus* Dohrn.

52. DIEUCHES UNIGUTTATUS Thunb.
Pendulinus uniguttatus Thunb., *Hem. Rost. Cap.* (1822), **4**, 6.
———— guttatus Thunb., *Ins. Hem. tria gen.* (1825), 5.
Rhyparochromus bengalensis Dall., *List Hem.* (1852), **2**, 572, No. 34.
———— assimilis Dall., *ibid.*, p. 572, No. 35.
Deiuches yeh Dohrn, *Stett. Ent. Zeit.* (1860), **21**, 61.
Beosus uniguttatus Stål, *Berl. Ent. Ztschr.* (1866), **10**, 382.
———— Stål, *Ö. V. A. F.* (1870), 664.
Dieuches ———— Stål, *Enum. Hem.* (1874), **4**, 162.
———— Distant *Fauna British Ind., Rhyn.* (1904), **2**, 82 fig. 64.

This species has been recorded from India, Ceylon, Andamans and other islands of the Malay Archipelago as well as from Hongkong. It has been recorded previously from the Philippines.

PALAWAN, Iwahig, P. I., (10913 *W. Schultze*). A single specimen.

Fam. PYRRHOCORIDÆ.

Subf. PYRRHOCORINÆ.

ECTATOPS Amyot & Serville.

Hém. (1843), 273.
Type: *E. limbata* Amy. & Serv.

53. ECTATOPS SEMINIGER Stål, *Berl. Ent. Zetschr.* (1863), **7**, 397.
Ectatops seminiger id., *Enum. Hem.* (1870), **1**, 105.
———— id., *Ö. V. A. F.* (1870), 666.

This species, in which there is considerable variation as to color, was taken in what might be considered as four varieties, if seen separately.

Var. *a*. Thorax black, remainder of dorsum, including membrane, coral red.

Var. *b*. Thorax black, remainder red, with small black basal spot to membrane.

Var. *c*. Entire dorsum coral red, including dorsum of thorax and membrane.

Var. *d*. Entire dorsum red, membrane entirely black.

A pair, caught and preserved *in coitû*, shows ♂ of var. *c* and ♀ of var. *a*.

PALAWAN, Iwahig, P. I., (10943 *W. Schultze*), 10 specimens, one pair *in coitû;* Iwahig, P. I., (11637 and 11703 *C. M. Weber*).

DINDYMUS Stål.

Ö. V. A. F. (1861), 196.
Type: *D. bicolor* Herr.-Schäff.

54. DINDYMUS PULCHER Stål.
Didymus pulcher Stål, *Berl. Ent. Ztschr.* (1863), **7**, 400.
———— id., *Enum. Hem.* (1870), **1**, 110.
———— id., *Ö. V. A. F.* (1870), 666.

Of this insect, which is not common, there were collected as nymphs and adults, 5 specimens by Schultze, and 3 specimens by Weber.

PALAWAN, Iwahig, P. I., (10942 *W. Schultze*); Bacuit, P. I., (11676 *C. M. Weber*).

One of the specimens captured by Weber has its rostrum inserted in a tiny hole which it has bored in the shell of a very small snail.

55. DIDYMUS MUNDUS Stål.

Didymus mundus Stål, *Berl. Ent. Ztschr.* (1863), **7**, 398.
— [illegible] id. *Enum. Hem.* (1879), **1**, 110.
— [illegible] — id. *Ö. V. A. F.* (1870), 666.

This species differs from *D. pulcher* in the absence of the white marking on the posterior area of the pronotum. The antennæ, except the apical segments, are entirely black.

PALAWAN, Bacuit, P. I., (11662 *C. M. Weber*), 2 specimens, ♂ and ♀ *in coitû*.

DYSDERCUS Amyot and Serville.

Hém. (1843), 272.
Type: *D. cingulatus* Fabr.

56. DYSDERCUS CINGULATUS Fabr.

Cimex cingulatus Fabr., *Syst. Ent.* (1775), 719.
[illegible] — Goeze, *Ent. Beytr.* (1778), **2**, 256.
— [illegible] Fabr., *Spec. Ins.* (1781), **2**, 364.
— [illegible] id., *Mant. Ins.* (1787), **2**, 299.
— [illegible] Gmel., *Syst. Nat.* (1788), **1**, pt. 4, 2172.
[illegible] superstitiosus Thunb., *Nov. Ins. Spec.* (1784), **3**, 55.
— [illegible] Stål, *Hem. Afr.* (1865), **3**, 15 (note).
[illegible] koenigii Fabr., *Syst. Ent.* (1775), 720.
[illegible] Goeze, *Ent. Beytr.* (1778), **2**, 257.
[illegible] Fabr., *Spec. Ins.* (1781), **2**, 364.
[illegible] id., *Mant. Ins.* (1787), **2**, 299.
[illegible] Gmel., *Syst. Nat.* (1788), **1**, 4, 2172.
Lygæus cingulatus Fabr., *Syst. Ent.* (1794), **4**, 153.
— [illegible] - id., *Syst. Rhyng.* (1803), 221.
— [illegible] – Montr., *Ann. Sci. Phys. et Nat.* (1855) (3), **7**, 1, 105.
— – koenigii Fabr., *Ent. Syst.* (1794), **4**, 155.
— [illegible] Wolff, *Icon. Cim.* (1800), **1**, 28, fig. 28.
[illegible] Fabr., *Syst. Rhyng.* (1803), 222.
[illegible] var. capensis Wolff, *Icon. Cim.* (1802), **3**, 107, fig. 101.
Pyrrhocoris koenigii Hahn, *Wanz. Ins.* (1834), **2**, 12, fig. 122.
Astemma koeningii Blanch., *Hist. des Ins.* (1840), 128, pl. 4, fig. 8.
Dysdercus [illegible] A. & S. *Hist. des Hém.* (1843), 272.
Pyrrhocoris solenis H.-S., *Wanz. Ins.* (1844), **7**, 18, fig. 700.
Dysdercus koenigii Mayr, *Reise der Freg. Novara., Hem.* (1866), 134.
— [illegible] Stål, *Hem. Fabr.* (1868), **1**, 84.
[illegible] cingulatus id., *Enum. Hem.* (1870), **1**, 119.
— [illegible] id., *Ö. V. A. F.* (1870), 667.
[illegible] Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 118, fig. 87.

This extremely common and widespread species, of lengthy synonymy, is found throughout the Philippines,

Palawan, Iwahig, P. I., (10937 *W. Schultze*), 5 specimens taken merely for the sake of locality.

57. Dysdercus poecilus Herr.-Schäff., *Wanz. Ins.* (1844), 7, 17, fig. 699.

This variable species has been given heretofore in synonymy with *D. cingulatus.*[6] Although I have not been able to see Herrich-Schäffer's description, I have compared specimens in the British Museum with those from the Philippines and also large series of the two species with each other. I have concluded that they are quite distinct species, even though there is considerable variation in *poecilus.* There are certain constant features, as the black anterior area of the pronotum and the black sterna and abdominal segments interspersed with white, which are not found in *cingulatus,* these portions always being red in the latter at least in Philippine material.

It is therefore proposed to consider this a valid species, at least until an opportunity to see the original description presents itself.

Palawan, Iwahig, P. I., (10938 *W. Schultze*), 3 specimens showing the same characters as specimens collected in other parts of the Islands.

Bacuit and Iwahig, P. I., (11665 and 11908 *C. M. Weber*), 6 specimens.

58. **Dysdercus ellanorae** sp. nov.

Elongate regular oval, pale vermilion, grey and black with white markings beneath.

Head uniformly pale vermilion above and below; eyes dark brown as are all segments of antennæ except first which is vermilion on basal half and bears three minute bristles on the interior surface of its basal nodule. Antenniferous tubercles white-ringed apically. Collar of prothorax dorsally and ventrally white; anterior lobe of pronotum finely punctate, posterior lobe and corium more coarsely; anterior area of posterior lobe at transverse depression luteous, the remainder vermilion; scutellum concolorous with pronotum, finely punctate and transversely rugose on margins.

Corium pale vermilion on costal third; remainder, including clavus pale ash-grey. Each tegmen with a discal, subcircular, transverse, black spot, similar in shape and position to that of *D. cingulatus* Fabr. Membrane black-brown with metallic luster, its posterior margin albescent.

Beneath, vermilion with white markings as follows: posterior margins of pro-, meso- and metapleurae, anterior margin of propleura and prosternum, apical margins of abdominal segments and all stethi.

[6] *Vide* Stål *Enum. Hem.* (1870), 1, 119.

All femora vermilion, fuscous apically; all tibiæ and tarsi dark fuscous. Rostrum vermilion, the apical half of last segment dark fuscous.

Length 14 to 16 millimeters; width 4.5 to 5.5 millimeters.

Rizal, Montalban Gorge, P. I., (*Banks* collector).

Type No. 5360 in Entomological Collection, Bureau of Science, Manila, P. I.

Palawan, Bacuit, P. I., (11677 *C. M. Weber*); Bataan, Lamao, P. I., (10342 *E. M. Ledyard*); Benguet, Baguio, P. I., (10329 *W. Schultze*).

It is noteworthy that all of these specimens were taken in regions elevated from 50 to 1,500 meters.

This beautiful insect, which I have dedicated to my wife, Ella Nora Banks, does not vary in color and markings, though there is a slight variation in size, the type specimen being of the maximum measurement.

Fam. ARADIDÆ.

Subf. Brachyrhynchinæ.

Div. BRACHYRHYNCHARIA.

ACANTHARADUS[7] Banks.

Gen. nov.

Type: *A. giganteus* Banks, sp. nov.

Head and pronotum subequal in length, former slightly longer; juga porrect, stylate, passing tylus by its own length; antenniferous prominences half length of head, divergent, apically bispinose; postocular tubercles bispinose; first antennal segment tumescent, apically transversely sulcate or bifid, second segment shorter, more slender, third as long as first, fourth half length of third, apically tumescent. Rostrum inserted at middle of ventral surface of head in sulcus. Prosternum sulcate; sides of sulcus elevated. Anterior pronotal angles greatly crenulately lobate; lobes two-thirds as long as head and slightly diverging anteriad; posterior angles widely crenulately lobate, these half length of anterior; humeral angles of tegmina crenulately sublobate.

Scutellum subequilaterally triangular, its base obtusely subangular and slightly overlapping posterior margin of pronotum, medially dentately carinate, apex dorsally foveate. Corium nearly twice length of scutellum.

Abdominal margin deeply crenulate; posterior lateral angles of segments obtusely dentate. Connexivum with double and parallel series of semitranslucent annulations, equally conspicuous dorsally and ventrally on all segments except first; second and sixth having but two annulations, all others, to fifth, four. Sixth segment dorsally elevate, crateral. Margin of fifth ventral segment in ♀ semicircularly excavate.

[7] *ακανθα*=a spine, a thorn; *αραδοσ*, *nom. gen.*=rattling like armor.

Coxæ nearly one-third length of femora which are strongly incrassate.

Type: *Acantharadus giganteus* Banks, sp. nov.

This genus is nearest related to *Alyattes* Stål, but differs in many essential features, as: pronotal foliations, relative length of scutellum and corium and in the absence of the curved carina on pronotum.

59. **Acantharadus giganteus** sp. nov. (Plate II, fig. 8, *a*.)

Broadly ovate, brown and brown-ochraceous; margins of entire body deeply crenulate; head dark brown, finely rugose-tuberculate, sparsely pilose; apices of juga and of antenniferous processes pale brown. Rostrum sparsely pilose. Antennæ dark brown, with sparse golden pile; apex of fourth segment pale, densely pilose. Anterior and posterior pronotal lobes brown-ochraceous, sparsely pilose; on anterior area two shallow foveæ surrounded by tuberculate annulations, within which a smaller tuberculate ring mediad; posterior margin sinuate before scutellum; the latter with elevated tuberculate margins; the basal angles pale. Corium with tuberculate veins, the apical cross-vein terminating before apex of clavus. Apex of corium acuminate, pale brown. Membrane nearly black, the veins on costal area anastomosing, those on posterior area simple and subparallel, conspicuous. Connexivum dark brown, except on fourth to sixth segments, the apical angles of which are brown-ochraceous. Connexival annulations semitranslucent, a few on each segment having dark spots at their centers. Visible sclerites of seventh abdominal segment of same shape as antenniferous processes of head. Discs of metasternum and abdomen brown-ochraceous, remainder of ventrum and legs dark brown. All femora and tibiæ hispid or coarsely pilose.

Length 15 millimeters; greatest width (connexival) 7.5 millimeters, width of pronotum 6 millimeters.

Palawan, Iwahig, P. I., (*C. M. Weber* collector).

Type No. 11699 in Entomological Collection, Bureau of Science, Manila, P. I. The type lacks the left posterior leg.

BRACHYRHYNCHUS Laporte.

Ess. Hém. (1832), 54.

Type: *B. membranaceus* Fabr.

60. Brachyrhynchus tagalicus Stål.

Arictus tagalicus Stål, *Ö. V. A. F.* (1870), 672.

———————— Bergr., *Verh. Z.-B. Gesellsch. Wien.* (1886), **36**, 59, pl. 2, figs. 5 and 7.

Brachyryhynchus tagalicus Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 162.

This species is known also from Burma, Java and Nias Island. It is a very distinct form.

Palawan, Iwahig, Bacuit and Bintuan, P. I., (11660, 11667, 11693, *C. M. Weber*). A number of specimens from each place.

NEUROCTENUS Fieber.

Eur. Hem. (1861), 34.
Type: *N. caffer* Stål.

61. NEUROCTENUS PAR Bergr.

Crimia rubrescens (part) Walk., *Cat. Het.* (1873), **7**, 14.
Neuroctenus par Bergr., *Öfv. Finska Vet. Soc. Förh.* (1887), **29**, 180.
——————— Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 164.

Walker described specimens of this and the following species together under the same name in 1873, Bergroth separated this as a distinct species in 1887. The species certainly show a marked difference both in size, color and sculpture.

PALAWAN, Iwahig, P. I., (11733 *C. M. Weber*), 6 specimens.

62. NEUROCTENUS SERRULATUS Stål.

Neuroctenus serrulatus Stål, *Ö. V. A. F.* (1870), 674.
Crimia rubrescens (part) Walk., *Cat. Het.* (1873), **7**, 14.
Neuroctenus serrulatus Stål, *Enum. Hem.* (1873), **3**, 145.
——————— — — Bergr., *Öfv. Finska Vet. Soc. Förh.* (1887), **29**, 179.
— ——————— Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 165.

This species, originally described from the Philippines, is known also in Java, Siam, Ceylon and India.

PALAWAN, Iwahig, P. I., (11705 *C. M. Weber*). A single specimen.

63. NEUROCTENUS NITIDULUS Bergr.

Neuroctenus nitidulus Bergr., *Öfv. Finska Vet. Soc. Förh.* (1887), **29**, 177.
——————— id., *Ent. Tidskr.* (1894), **15**, 113.
——————— Dist. *Fauna British Ind., Rhyn.* (1904), **2**, 165.

This is a very easily recognized species, owing to its shining surface. This is its first record for the Philippines. It is quite abundant at Iwahig.

PALAWAN, Iwahig, P. I., (11735 *C. M. Weber*), 14 specimens.

64. **Neuroctenus weberi** sp. nov.

Elongate, ovate, dark red-brown to piceous, slightly paler beneath; head with preocular and postocular spinous processes of about equal length, equally acute; postocular just passing eyes, which are scarlet; anterior, cephalic process extending beyond apex of first antennal segment by one-half the length of the latter; its apex distinctly bifid and slightly broader than its base; tylus subprominent, but deflected between juga before bifid apex; mediad to each eye a broad longitudinal opaque sulcus; first, second and fourth antennal joints equal, robust; third slightly longer and more slender; fourth with lutescent pile at apical third; rostral segments equal; pale brown, tip darker. Pronotum with distinct carmine collar.

Granulations on head, pronotum and scutellum minute and uniformly distributed; transverse pronotal impression sinuate; scutellum obtusely sub-angulate at apex.

Corium slightly longer than scutellum; its apical transverse vein nearly straight, curved cephalad at mid longitudinal vein; its costal vein pale, translucent brown, its apical margin broadly albescent; base of membrane transversely albescent; remainder and veins nearly black. Connexivum red-brown; the submarginal parallel area darker. Anterior and intermediate femora strongly incrassate, granulate, posterior less so; all tibiæ denticulate externally.

Length 5.25 millimeters; greatest width 2 millimeters.

PALAWAN, Iwahig, P. I., *C. M. Weber,* collector, to whom the species is dedicated.

Type ♂ No. 11734 in Entomological Collection, Bureau of Science, Manila, P. I.

Another collection of this species from Iwahig (11646 *C. M. Weber*), 25 specimens. Among these the individuals vary in length from the size of the type to 5.75 millimeters, and are somewhat darker in color.

65. **Neuroctenus antennatus** sp. nov.

Elongate, ovate; piceous, nearly black; tuberculate; first segment of antennae just reaching apex of juga, second joint shorter than first, less tumescent, third longest, one-fourth longer than second, very slender in comparison with others; fourth as long as second. Intraocular foveæ obsolescent; collar to pronotum almost obsolete. Granulations on head, prothorax and scutellum, coarse, evenly distributed; scutellum broader and shorter than in *N. weberi.* Corium with apex, acuminate, black; base of membrane albescent as is apical margin of corium. Ventrum piceous; femora tumescent granulate; tibiæ not serrulate along dorsal margins.

Length 5.75 millimeters; width of pronotum 1.75 millimeters, of abdomen 2.25 millimeters.

PALAWAN, Bacuit, P. I., (*C. M. Weber* collector).

Type No. 11732 in Entomological Collection, Bureau of Science, Manila, P. I. Two paratypes bear the same number.

This species differ from *N. weberi* in having the first antennal segment reaching the apex of juga, in the great length and slenderness of third segments, in the shape of the scutellum and in the almost entire absence of the intraocular foveæ and the anterior collar to pronotum.

Fam. HYDROMETRIDÆ

Subf. GERRINÆ.

Div. GERRINARIA.

LIMNOMETRA Mayr.

Reise Novara, Hem. (1866), 174.
Type: *L. femorata* Mayr.

66. LIMNOMETRA FEMORATA Mayr. (Plate II, fig. 3, a.)
Limnometra femorata Mayr, *Reise der Freg. Novara, Hem.* (1866), 174.
——— ——— Stål, *Ö. V. A. F.* (1870), 705.

This species which very closely resembles *L. cursitans* Fabr., differs from it in having the apical portions of the intermediate and posterior femora and the apical half of the intermediate tibiæ luteous, and the apex of the first and the whole of the fourth antennal segments albescent. Distant places this genus as synonymous with *Gerris*.

Palawan, Iwahig, P. I., (11228 *W. Schultze*), 4 specimens.

GERRIS Fabr.

Ent. Syst. (1794), **4**, 187.
Type: *G. lacustris* Linn.

67. Gerris ?anadyomene Kirk. (Plate II, fig. 1.)
Gerris ?anadyomene Kirk., *Entomologist* (1901), **34**, 117.
——————————— Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 177.

The two specimens at hand have been referred doubtfully to this species. One of them is apterous and the other winged. They differ from Kirkaldy's description in having the middle of the second, the subbasal portion of the third antennal segments luteous and the whole of the apical segment except its base, white.

Palawan, Iwahig, P. I., (11229 *W. Schultze*), 2 specimens.

Fam. REDUVIIDÆ.

Subf. Emesinæ.

Div. EMESARIA.

GARDENA Dohrn.

Linn. Ent. (1863), **14**, 214.
Type: *G. melinarthrum* Dohrn.

68. Gardena semperi Dohrn.
Gardena semperi Dohrn, *Linn. Ent.* (1863), **15**, 64.
— — ——— Stål, *Ö. V. A. F.* (1870), 704.
— — ——— id., *Enum. Hem.* (1874), **4**, 96.

Palawan, Bacuit, P. I., (11905 *C. M. Weber*), 2 specimens.

Subf. Stenopodinæ.

ONCOCEPHALUS Klug.

Symb. Phys. (1830), 2.
Type: *O. notatus* Klug.

69. Oncocephalus impudicus Reut., *Act. Soc. Sc. Fenn.* (1883), **12**, 715, pl. 2, figs. 26 and 27.
Oncocephalus impudicus Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 229.

Recorded also from Java, Sumatra, Borneo and the Philippines. This species is very common on the Island of Negros and in Manila.

Palawan, Iwahig, P. I., (10867 *W. Schultze*). A single specimen.

Subf. ACANTHASPIDINÆ.

Div. ACANTHASPISARIA.

ACANTHASPIS Amyot and Serville.

Hém. (1843), 336.
Type: *A. flavovaria* Hahn.

70. **Acanthaspis distanti**[8] sp. nov.

Piceous, with sericeous and and ochraceous markings and a dark brown ovate spot at base of membrane between veins II and III.

Head nearly black, sericeous and with erect pile; a distinct, dark brown, median, glabrous carina from before anterior transverse impression to base of tylus which is also elevated above juga. Eyes dark brown; ocelli ochraceous; basal segment and apex of second segment of antennæ piceous (remainder of antennæ broken off). A well-defined transverse sulcus posterior to eyes and anterior to ocelli. Anteocular and postocular regions about equal, the latter slender.

Anterior lobe of pronotum piceous with sericeous sculpture as follows: Collar transversely, posterior to which medially three short longitudinal fasciæ terminated by an oblique fascia on each side from near median line to anterior lateral angles; posterior to oblique fascia on each side three short longitudinal fasciæ, the middle one curving lateral and coalescing with outer before anterior lateral angle. Posterior lobe rugosely sericeous, with a slight median fovea cephalad. Lateral angles acuminate, pale, hirsute. Lateral margins ochraceous. Scutellum medially foveate basally; spine suberect, hirsute, pale apically. Elytra piceous, slightly passing apex of abdomen; corium piceous, sparsely sericeous, with pale subbasal spot, a pale streak on median vein to its apex, then following apical margin of corium and curved anteriad on inner vein, thence to near apex of clavus. A small, pale, transverse streak from beginning of first streak halfway to costal margin. Lying exteriad and posteriad to the first and this, a dark brown spot. Membrane dark fuscous, the veins lighter, but bordered with piceous. A large, dark brown, nearly black, velvety spot at middle of base touching corium. Connexivum alternately piceous and ochraceous. Abdomen beneath uniformly piceous, sericeous except in region of stigmata.

Acetabula ochraceous, remainder of sternum piceous, moderately sericeous. Femora dark ochraceous, anterior and intermediate with basal, medial and apical piceous annulations; posterior with pale bases and two piceous rings beyond and one just before middle.

[8] After this paper was in press I received a MS. from Mr. W. L. Distant in which he also described this species as new. As I could not get his paper published before mine, I have taken the only alternative and am glad to be able to change the name which I had given it to *A. distanti*. A figure of the species will occur in Mr. Distant's paper, to be published shortly in this Journal.

Anterior and mid tibiæ with a spongy fovea on their apical halves; apices of anterior tibiæ rounded and foveate dorsally for reception of tarsi, which, with those of remaining legs, are pale fuscous; their bases and apices piceous, their middle portions ochraceous. Posterior tibiæ with three equal annulations, the apical and basal piceous, the middle ochraceous. All legs with fine erect hairs.

Length 14 millimeters; width of pronotum 3.9 millimeters.

PALAWAN, Iwahig, P. I., (*C. M. Weber*, collector).

Type No. 11904 in Entomological Collection, Bureau of Science, Manila, P. I.

This species appears to be most closely related to *A. signaticollis* Stål, but may be easily differentiated from its close allies by the presence of the large dark spot at base of membrane and the sericeous pattern on the anterior lobe of the pronotum.

Div. LENÆARIA.

VELITRA Stål.

Hem. Afr. (1865), **3**, 122.
Type: *V. rubropicta* Amy. & Serv.

71. VELITRA RUBROPICTA Amy. & Serv.

Opinus rubropictus Amy. & Serv., *Hém.* (1843), 339.
Platymerus discolor Herr-Schäff., *Wanz. Ins.* (1848), **8**, 31, fig. 805.
Velitra rubro-picta Stål, *Ö. V. A. F.* (1870), 695.
Reduvius rivulosus Walk., *Cat. Het.* (1873), **7**, 194.
Velitra rubropicta Stål, *Enum. Hem.* (1874), **4**, 69.
——— Dist., *Ann. Mag. Nat. Hist.* (1902) (7), **10**, 189.
——— id., *Fauna British Ind., Rhyn.* (1904), **2**, 276, fig. 182.

This species appears to be rare in the Philippines. No specimen has been brought to this laboratory previous to the one here recorded.

PALAWAN, Mangahan Swamp near Iwahig, P. I., (11681 *C. M. Weber*). A single specimen, slightly mutilated.

SMINTHOCORIS Distant.

Fauna British Ind., Rhyn. (1904), **2**, 279.
Type: *S. pictus* Lap.

72. SMINTHOCORIS PICTUS Lap.

Tapeinus pictus Lap., *Ess. Hém.* (1832), 82.
Tapinus ——— Burm., *Handb.* (1835), **2**, pt. 1, 236.
Hammatocoris —— Blanch., *Hist. Ins.* (1840), **3**, 105.
Opinus ——— A. & S., *Hist. Nat. des Ins.* (1843), 340.
Tapinus ——— Herr-Schäff., *Wanz. Ins.* (1843), **8**, 56, fig. 825.
Sminthus —— Stål, *Ö. V. A. F.* (1870), 694.
——— id., *Enum. Hem.* (1874), **4**, 68.
Sminthocoris — Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 279 [ref.].

Though not having the original description of this species, I feel certain of the identification because of the statement made by Stål in describing *S. zonatus* in "Enumeratio Hemipterorum" in which he says: "S. picto

simillimus, differt parte anteriore pallida hemelytrorum postice truncata, parte fusca corii ante partem fuscam membranae haud extensa", while the rest of the description of *zonatus* agrees perfectly with the insects at hand.

PALAWAN, Mangahan Swamp near Iwahig, P. I., (11683 *C. M. Weber*). Two adult and one young specimen.

Subf. PIRATINÆ.

ECTOMOCORIS Mayr.

Verh. Z.-B. Ges. Wien (1865), **15**, 438.
Type: *E. quadriguttatus* Fabr.

73. ECTOMOCORIS FLAVOMACULATUS Stål (Plate II, fig. 7.)
Ectomocoris flavomaculatus Stål., *Ö. V. A. F.* (1870), 692.
Eumerus ——————————— id., *Enum. Hem.* (1874), **4**, 62.

This species was described by Stål from the Philippines and has been collected by me in Manila. I do not think his points of differentiation warrant making a new genus for this species and have therefore retained it in *Ectomocoris.*

PALAWAN, Iwahig, P. I., (10956 *W. Schultze*).

Subf. ECTRICHODIINÆ.

ECTRYCHOTES Burmeister.

Handb. der Ent. (1835), **2**, 237.
Type: *E. pilicornis* Fabr.

74. ECTRYCHOTES HÆMATOGASTRA Burm.
Reduvius (Loricerus) hæmatogaster Burm., *Nov. Act. Ac. Leop.* supp. prim. (1834), 301, Tab. 41, fig. 9.
Larymna hæmatogastra Stål, *Ö. V. A. F.* (1860), **16**, 184.
— ——————————— Mayr, *Reise Novara., Hem.* (1866), 156.
Larymna ——————————— Stål, *Ö. V. A. F.* (1870), 891.
Ectrichodia ——————————— Walk., *Cat. Het.* (1873), **8**, 55.
Ectrychotes ——————————— Stål, *Enum. Hem.* (1874), **4**, 51.

This species was originally described from the Philippines and has been taken by me in various parts of Luzon and Negros.

PALAWAN, Iwahig, P. I., (10862 *W. Schultze*), 3 specimens. Mangahan Swamp near Iwahig (11684 and 11907 *C. M. Weber*), 13 specimens.

Subf. APIOMERINÆ.

ECTINODERUS Westwood.

Proc. Ent. Soc. (1843), 74.
Type: *E. longimanus* Westw.

75. ECTINODERUS BIPUNCTATUS Amy. et Serv.
Pristhevarma bipunctata Amy. et Serv., *Hém.* (1843), 355, pl. 6, fig. 5.
Ectinoderus bipunctatus Stål, *Ö. V. A. F.* (1866), 245.
——————————————— Dist., *Fauna British Ind., Rhyn.* (1904), **2**, 326, fig. 211.

This is the first record of this species as from the Philippines, though it has been recorded from Java, Sumatra and Borneo, and two closely related species are known from these Islands, viz., *E. philippinensis* Westw., and *E. nitidus* Stål.

The specimens from Palawan are easily recognizable and the pale pronotum and spots on the corium, together with sanguineous bases of the femora, make their identity certain.

PALAWAN, Iwahig, P. I., (10859 *W. Schultze,* 11906 *C. M. Weber*), 3 specimens.

I have recently received five specimens of *E. philippinensis* Westw., from Limay, BATAAN, collected by R. J. Alvarez of the Bureau of Forestry. This species is much larger than *bipunctatus.*

Subf. HARPACTORINÆ.

Div. HARPACTORARIA.

HARPACTOR Laporte.

Ess. Hém. (1832), 8.
Type: *H. iracundus* Poda.

76. HARPACTOR MARGINELLUS Fabr.

Reduvius marginellus Fabr., *Syst. Rhyng.* (1803), 271.
-- —— —— ———— Stål, *Hem. Fabr.* (1868), 1, 111.
Lamphirus —— —— id., *Enum. Hem.* (1874), 4, 39.
- ——— —— —— var. vicinus Stål, *Ö. V. A. F.* (1859), 202.
Harpactor ———— Dist., *Fauna British Ind., Rhyn.* (1904), 2, 334.

The specimen before me is Distant's var. *a,* having the red-ochraceous abdominal margins, spotted with black. The species is known from Burma, Sikhim, Aden, Borneo, Java, Celebes and China. It has not been reported from the Philippines previously.

PALAWAN, Iwahig, P. I., (11701 *C. M. Weber*). A single specimen.

SPHEDANOLESTES Stål.

Ö. V. A. F. (1866), 284, 288.
Type: *S. impressicollis* Stål.

77. **Sphedanolestes xanthopygus** sp. nov. (Plate I, fig. 6,*a*.)

Brown, except legs and ventral surface of abdomen which are piceous; glabrous, sparingly pilose. Head, antennæ and rostrum concolorous, postocular region equal to distance from apex of head to posterior margins of eyes and having, posterior to ocelli, four erect bristles, the tips of which curve forward; ocelli lemon-yellow, on slight tubercles; posterior lobe of pronotum obsoletely granular, tuberculate. Scutellum with Y-shaped pale carina on apical half; corium and membrane fuliginous, apical angle of former piceous; dorsum of abdomen sordid yellow, irrorated with piceous, except last segment which is piceous. Pygidium orange-yellow in both sexes.

Legs clothed with fine erect hairs. Tibiæ apically with silver pubescence.

Length to tip of abdomen 10 millimeters; to tip of tegmina 12 millimeters; width 2.5 millimeters.

PALAWAN, Iwahig, P. I., (*W. Schultze,* collector).

Types of ♂ and ♀ No. 10869 in Entomological Collection, Bureau of Science, Manila, P. I.

A single male and a single female, only, were collected. This species differs from every described species in the monotony of its general coloring and in the color of the pygidium.

Div. SYCANARIA.

SYCANUS Amyot and Serville.

Hém. (1843), 360.
Type: *S. collaris* Fabr.

78. SYCANUS COLLARIS Fabr.

Reduvius collaris Fabr., *Spec. Ins.* (1781), **2,** 380.
Cimex carbonarius Gmel., *Syst. Nat.* (1788) (1), **4,** 2199.
Zelus collaris Fabr., *Syst. Rhyng.* (1803), 285.
Reduvius longicollis Lepell. & Serv., *Enc. Méth.* (1825), **10,** 278.
Zelus collaris Amy. & Serv., *Hém.* (1843), 360.
Arilus ——— Herr.-Schäff., *Wanz. Ins.* (1848), **8,** 37, fig. 813.
Sycanus —— Dohrn, *Stett. Ent. Zeit.* (1859), **20,** 98.
——— leucomesus Walk., *Cat. Het.* (1873), **8,** 84.
——— collaris Stål, *Enum. Hem.* (1874), **4,** 28.
——— Dist., *Ann. Mag. Nat. Hist.* (1903) (7), **11,** 212.
——— ——— id., *Fauna British Ind., Rhyn.* (1904), **2,** 351, fig. 225.

Known from India, Ceylon and several islands of the Malay Archipelago.

PALAWAN, Iwahig, P. I., (10858 *W. Schultze*), 5 specimens in fair condition; Bacuit, P. I., (11671 and 11913 *C. M. Weber*), 2 specimens.

Div. EUAGORASARIA.

MACRACANTHOPSIS Reuter.

Act. Soc. Sc. Fenn. (1881), **12,** 282.
Type: *M. nodipes* Reut.

79. **Macracanthopsis nigritibialis** sp. nov. (Plate I, fig. 7,*a*.)

Elongate, ovate, ochraceous, pubescent; antennæ, posterior tibiæ, a spot near apical angle of corium and all tarsi black.

Head pale, dull ochraceous; ocelli red; eyes brown; apex of rostrum piceous; first segment of antennæ shining black, second opaque, third and fourth brown; first slightly longer than combined length of second and third; fourth as long as first and third; apices of post-antennal spines fuscous; juga conically, porrectly produced; fuscous; anterior lobe of

pronotum with distinct longitudinal fovea; anterior angles sublobately produced; lateral angles of posterior lobe tumescent, subacute, their margins slightly reflexed. Scutellum tumescent basally, medially carinate apically, pubescent. Tegmina extend beyond apex of abdomen for one-third their length. Apical half of clavus translucent, foliate; apical margin of corium concave at juncture with membrane which is fuliginous on basal half; apical angle of corium acuminate; a black spot on its costal area twice its own length from angle.

Entire body beneath pale ochraceous, glabrous, sparsely pubescent; all femora and tibiæ, except posterior, concolorous with body, pubescent; posterior tibiæ shining black, pubescent. All tarsi black.

Length 10 millimeters; to apex of tegmina 13 millimeters; width 3 millimeters; antennæ 15.5 millimeters.

PALAWAN, Bacuit, P. I., (*C. M. Weber,* collector).

Type No. 11666 in Entomological Collection, Bureau of Science, Manila, P. I.

This species is easily distinguished by the black posterior tarsi and the black spots before the apical angle of the corium.

Another specimen of this species was taken by Prof. Dean C. Worcester at Mansalay, MINDORO, on 16 July 1909. This specimen is labeled as the paratype. It is No. 11400 in the collection.

EUAGORAS Burmeister.

Hand. der Ent. (1835), **2**, 226.
Type: *E. stollii* Burm.

80. EUAGORAS PLAGIATUS Burm.

Zelus plagiatus Burm., *Nov. Act. Ac. Leop. Nat. Cur.*, Suppl. 1, (1834), **16**, 303.
Darbanus nigrolineatus (♂) Amy. & Serv., *Hém.* (1843), 371.
——— —— ——— Stål, *Ö. V. A. F.* (1859), 194.
Euagoras — — — id., *Stett. Ent. Zeit.* (1861), **22**, 136.
— — — plagiatus Stål, *Ö. V. A. F.* (1870), 679.
——— Distant, *Fauna British Ind., Rhyn.* (1904), **2**, 363, fig. 231.

This species, recorded from India, Assam, Andamans, Java, and by Stål from the Philippines, has been taken by me in Manila.

PALAWAN, Iwahig, P. I., (10864 *W. Schultze,* 11921 *C. M. Weber*), 10 specimens.

EPIDAUS Stål.

Ö. V. A. F. (1859), 192.
Type: *E. transversus* Burm.

81. EPIDAUS MACULIGER Stål, *Ö. V. A. F.* (1859), 192.
Epidaus maculiger Stål, *ibid.*, (1866), 271.
——— — Stål, *ibid.*, (1870), 679.
——— — id., *Enum. Hem.* (1874), **4**, 22.

Originally described from the Philippines.

The principal character by which this species may be separated from its close ally *E. transversus* Burm., is in its having the discoidal lobes of the posterior portion of the pronotum simple instead of bidentate.

PALAWAN, Iwahig, P. I., (10861 *W. Schultze*), 7 specimens; Bacuit, P. I., (11671 *C. M. Weber*).

ASTINUS Stål.

Ö. V. A. F. (1859), 193.
Type: *A. m-album* Amy. & Serv.

82. ASTINUS PUSTULATUS Stål (Pl. I fig. 2, a.)
Astinus pustulatus Stål, *Ann. Soc. Ent. Fr.* (1863) (4), **3**, 30.
— — — — id., *Ö. V. A. F.* (1866), **23**, 269.
— — — — id., *Enum. Hem.* (1874), **4**, 22.

This beautiful species, originally described from Borneo, is here recorded from the Philippine Islands for the first time.

The double series of ventral white, mouldy spots on the abdomen, separates this species from the closely related *A. modestus* Stål, described from Pulo Penang.

PALAWAN, Iwahig, P. I., (10860 *W. Schultze*), 6 specimens were taken in mangrove swamp; Bacuit, P. I., (11675 & 11915 *C. M. Weber*), 6 specimens.

Div. POLIDIDUSARIA.

SCIPINIA Stål.

Stett. Ent. Zeit. (1861), **22**, 137, 138.
Type: *S. horrida* Stål.

83. SCIPINIA HORRIDA Stål.
Sinea horrida Stål, *Freg. Eug. Resa, Ins.* (1859), 262.
— peltastes Dohrn, *Stett. Ent. Zeit.* (1860), **21**, 406.
Scipinia horrida Stål, *ibid.* (1861), **22**, 138.
— id., *Ö. V. A. F.* (1866), 264.
— ibid. (1870), 675.
— Stål, *Enum. Hem.* (1874), **4**, 15.
— Dist., *Fauna, British Ind., Rhyn.* (1904), **2**, 384, fig. 244

This species is extremely common in Manila, it being hardly possible to make a single sweeping in certain places, without securing numerous specimens.

PALAWAN, Iwahig, P. I., (11914 *C. M. Weber*), 1 specimen.

Fam. CAPSIDÆ.

Subf. CAPSINÆ.

Div. CYLLOCORARIA.

STHENARIDEA Reuter.

Ent. Tidskr. (1884), **5**, 197.
Type: *S. pusilla* Reut.

84. STHENARIDEA PUSILLA Reuter.
Sthenaridea pusilla Reut., *Ent. Tidskr.* (1884), **5**, 198.
— — — Dist. *Fauna British Ind., Rhyn.* (1904), **2**, 475, fig. 306.

PALAWAN, Tara Island, P. I., (11802 *C. M. Weber*), 1 specimen.

This specimen appears to correspond in every detail with the description and figure given by Distant, except that it is slightly smaller.

Fam. NEPIDÆ.

LACCOTREPHES Stål.

Hem. Afr. (1865), **3**, 186.
Type: *L. fabricii* Stål.

85. LACCOTREPHES ROBUSTUS Stål, *Ö. V. A. F.* (1870), 706.
Nepa robusta Ferrari, *Ann. Hoffm. Wien.* (1888), **3**, 182.
Laccotrephes robustus Montand., *Ann. Mus. Civ. Gen.* (1897), **37**, 376.
Nepa robusta var. pfeiferiæ Ferrari, *op. cit.* p. 187.
Laccotrephes robustus Montand, *op. et pag. cit.*
— — — Dist., *Fauna British Ind., Rhyn.* (1906), **3**, 18, fig. 13.

This species, originally described from the Philippines by Stål, has also a rather wide distribution outside the Archipelago. It is found in most parts of the Islands.

PALAWAN, Iwahig, P. I., (11231 *W. Schultze*), 2 adults and 1 nymph.

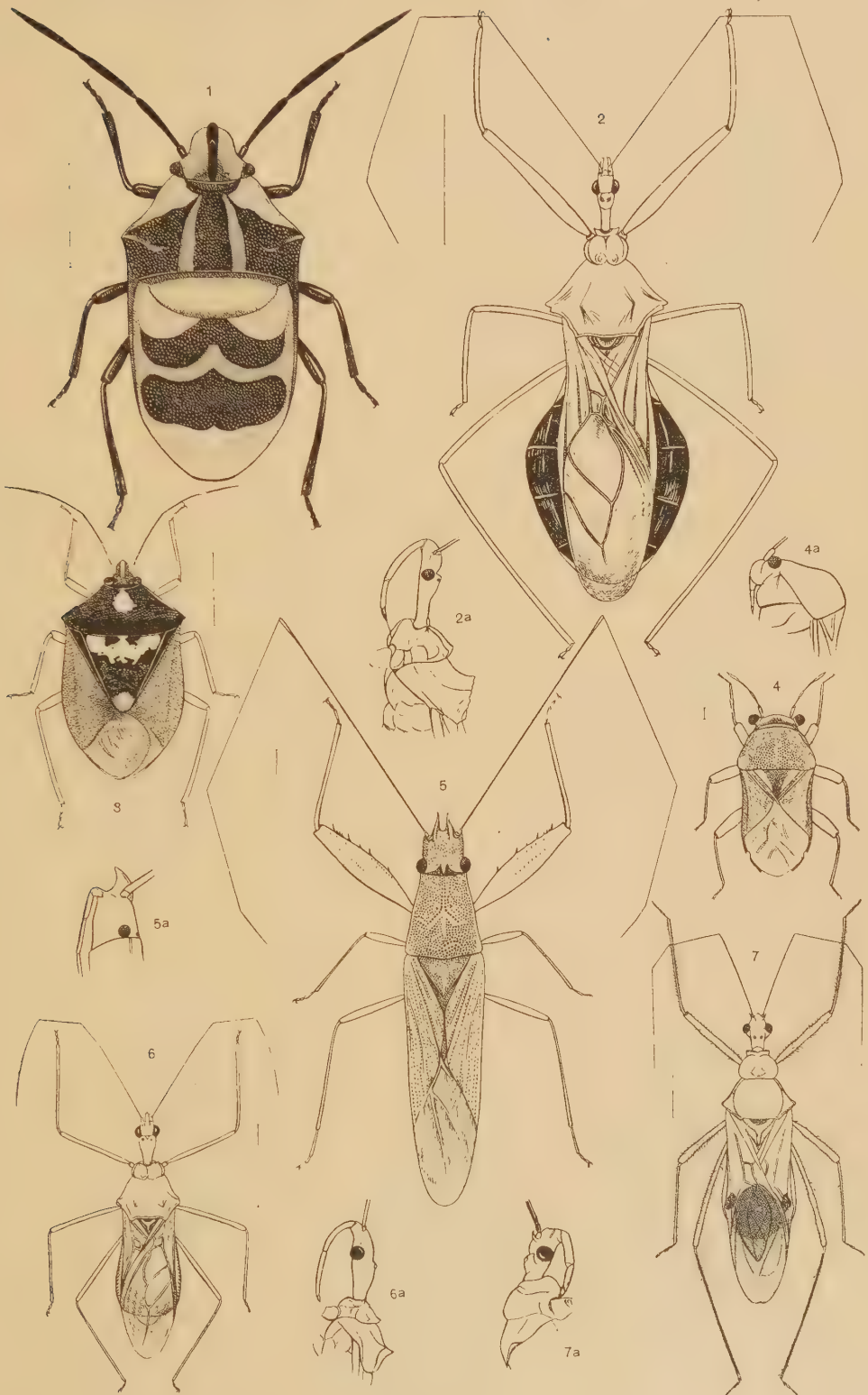
ILLUSTRATIONS.

Plate I.

Fig. 1. Cosmocoris pulcherrimus Banks, sp. nov.
2, *a*. Astinus pustulatus Stål.
3. Tolumnia longirostris Dallas.
4, *a*. Chauliops bisontula Banks, sp. nov.
5, *a*. Pachygrontha bicornuta Banks, sp. nov.
6, *a*. Sphedanolestes xanthopygus Banks, sp. nov.
7, *a*. Macracanthopsis nigritibialis Banks, sp. nov.

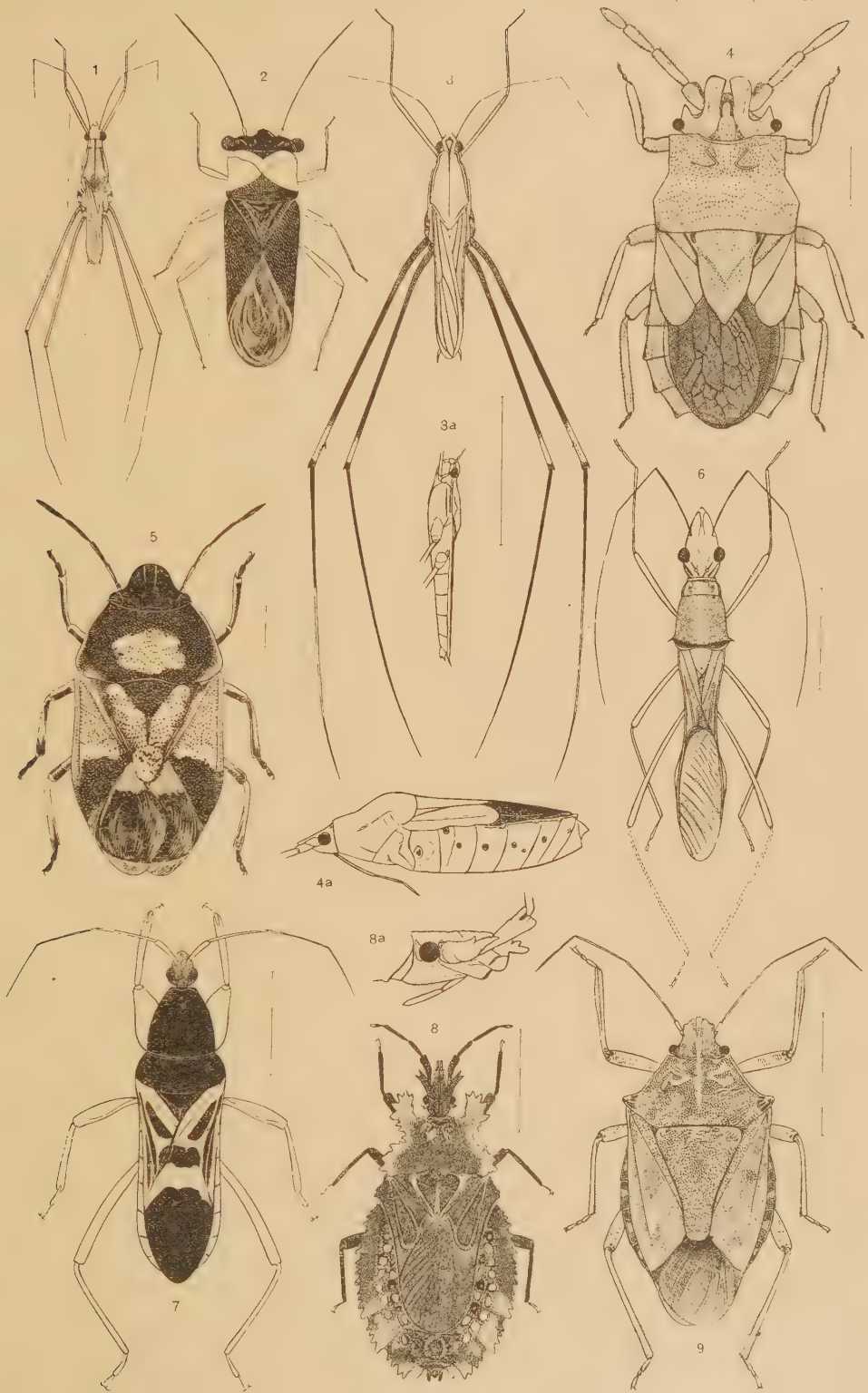
Plate II.

Fig. 1. Gerris ?anadymone Kirkaldy.
2. Scopiastes ruficollis Banks, sp. nov.
3, *a*. Limnometra femorata Mayr.
4, *a*. Eumenotes obscura Westwood.
5. Apines grisea Banks, sp. nov.
6. Marcius quinquespinus Stål.
7. Ectomocoris flavomaculatus Stål.
8, *a*. Acantharadus giganteus Banks, gen. et sp. nov.
9. Dalpada tagalica Stål.



W. Schultze, ad nat. del. 1909.

PLATE I.



W. Schultze, ad nat. del. 1909.

PLATE II.

A LIST OF SNAKES FOUND IN PALAWAN.

By Lawrence E. Griffin.

(*From the Biological Laboratory, Bureau of Science, Manila, P. I.*)

Two collections of snakes from Iwahig, Palawan, one made by Mr. C. M. Weber of Iwahig and the other by Mr. Schultze of this laboratory, have recently been placed in my hands. As these collections add considerably to the known Ophidian fauna of the island, it seems well to publish a complete list of the snakes now known to be found in Palawan. The only other considerable collection of snakes known to be from this island was made about sixteen years ago by Mr. Everett and described by Boulenger.[1]

In 1881 Peters [2] published the description of a snake from Palawan, *Doliophis bilineatus,* "the first poisonous snake recorded from the Philippines." Aside from these papers I do not know of any which treat of Palawan snakes. Cuming sent a number of snakes from the Philippines to the British Museum,[3] but since the locality is given as "Philippines" only, it is impossible to take them into account while listing the snakes of any particular locality.

Four new species are described in the following list; there is also recorded one genus and three species already known from other localities but now found for the first time in the Philippines. We now know of thirty-one species of snakes which exist in Palawan. Thorough exploration of the island will undoubtedly add many more species to the list, especially of marine forms. Fourteen species are added to Boulenger's list, and all tend to confirm his conclusion as to the close relationship of the Palawan reptiles with those of Borneo.

The species included in Weber's collection are indicated by an asterisk (*) after the name; those in Schultze's collection by a dagger (†); and those in Everett's collection, listed by Boulenger, by a double dagger (‡).

Python reticulatus (Schneider).*

Found throughout the Philippines.

[1] On the Herpetological Fauna of Palawan and Balabac. *Ann. Nat. Hist.* (1894), **14**, 81–89.

[2] *Sitzungsber. d. Ges. naturfor. Freunde zu Berlin,* 1881.

[3] Catalogue of the Snakes in the British Museum.

Polyodontophis bivitattus Blgr.‡

Found only in Palawan. The two specimens upon which Boulenger's description is founded are the only ones which have been collected.

Natrix spilogaster (Boie).‡

Found only in the Philippines. This is the most common snake in some parts of the Islands, but Everett's specimen is the only one so far recorded from Palawan.

Natrix chrysaryga (Schleg.)* † ‡

Found only in Palawan and Balabac of the Philippine Archipelago. This species is found outside the Philippines in Java, Sumatra, Borneo, India and China.

Ophites aulicus (Linn.)*

First collected in Palawan by Weber. Common throughout southeastern Asia, the Malay Archipelago, and the Philippines.

Ophites subcinctus (Boie).*

Found in Palawan, Mindanao, the Malay Peninsula and Archipelago. This is the first record of its occurrence in Palawan.

Dryocalamus philippinus n. sp.†

Maxillary teeth 8; the last two considerably larger than the others, compressed toward their points, and separated from the first six by a short space. The anterior mandibular teeth are slightly longer than the posterior. There is one distinct tooth-like knob on the basisphenoid. Width of head almost twice that of the neck; head much depressed and flattened. Eye large, pupil vertically elliptic. Body slightly compressed and slender. Scales smooth, no pits. Ventrals and subcaudals strongly keeled, the latter in two rows.

Rostral nearly twice as broad as deep, just visible from above; nasal entire; suture between internasals slightly longer than between præfrontals; frontal longer than its distance from the end of the snout, a little shorter than the parietals; loreal longer than deep, entering the eye; one small prae-ocular above the loreal; two post-oculars; temporals 2+3; seven upper labials, the third and fourth entering the eye; four lower labials in contact with the anterior chin-shields, which are longer than the posterior.

Black above, with three white stripes extending from the head to the tip of the tail, each stripe being one scale wide; the stripes are separated from each other and the white lower surface by two scale-rows; the outer row of scales on each side is white; upper lip, angle of jaw, and lower surface of head white; dark brown stripes pass along each side of the head, through the eyes, meet on the occipital region and join the dark stripes on each side of the neck; central portion of frontal and

parietals dark brown, surrounded by a white band which extends onto the præfrontals and internasals.

Total length 241 millimeters; tail 57 millimeters; scales in fifteen rows; anal entire; ventrals 216; subcaudals 99.

Iwahig, Palawan; collected by Mr. W. Schultze.

This seems to be the first specimen of the genus to be found within the Philippines. Members of the genus are found from southern India and Ceylon to Sumatra. In many respects *D. philippinus* is very much like *D. tristrigatus,* but the differences are sufficiently great to clearly differentiate the species. *D. philippinus* differs from all the other species of the genus in the absence of pits on the scales.

Elaphe oxycephala (Boie).*‡

This species is found recorded within the Philippines only from Palawan and Balabac. It is, however, a widely distributed species, found in the eastern Himalayas, Malay Peninsula and Archipelago.

Elaphe erythrura (D. & B.).‡

Widely distributed in the Philippines; also found in Celebes.

Elaphe philippina n. sp.*†

The species *Elaphe* (Coluber) *melanura, E. radiata, E. erythrura,* and *E. philippina,* form a very closely allied group in which *E. philippina* seems to be intermediate between *E. melanura* and *E. erythrura.* The number of scale rows is the same as in *E. erythrura,* as well as the general shape and arrangement of scales. The proportions of the head and body are, however, constantly different, and with the markings seem to present sufficient differences for constituting a separate species.

Scales feebly keeled, the outer row of scales on the body and tail smooth; rostral slightly broader than deep, broader at the top and more oval in its general outline than in *E. erythrura;* inter-nasals as broad as long, much shorter than the præfrontals; frontal very little longer than broad, as long as or a little shorter than its distance from the end of the snout, shorter than the parietals; loreal as deep as long; one large præocular extending upon the dorsal surface of the head; two small postoculars; temporals 2+2; nine upper labials, fourth, fifth and sixth entering the eye; five or six lower labials in contact with the anterior chin shields, which are a little shorter than the posterior.

Scales in 21 rows on the body and 23 on the neck. Lateral keel of ventrals very obtuse.

Light brown above; upper lip and ventral surface yellowish; the lateral ends of the ventral scales brown; a black streak on the lip below the eye, a black line extending from the eye to the angle of the mouth, and a longer black line extending from the temporals diagonally over the side of the neck; in a young specimen the anterior half of the body is crossed

by fourteen dark bars, each enclosing a white spot in its ventral ends, and sometimes other spots in the dorsal portion. Older specimens show only the lateral parts of the anterior three to six bands; in these the white centers are faint, while the black color extends well down on the sides of the ventral scales. The head of *E. philippina* is slightly narrower than that of *E. erythruras,* and the end of the snout a little more oblique.

Measurements of two adults of each species are as follows:

From tip of the snout to the posterior end of the parietal suture, *E. erythruras,* 26 millimeters, 24 millimeters; *E. philippina,* 26 millimeters, 23 millimeters.

Across the widest part of the head, *E. erythrurus,* 20 millimeters, 17½ millimeters; *E. philippina,* 17 millimeters, 15 millimeters.

This shows the head of *E. erythrura* to be a little more than one-sixth wider than that of *E. philippina.*

No.	Sex.	Locality.	Collector.	When collected.	Scale rows.	Anals.	Ventrals.	Subcaudals.	Total length.	Length of tail.
									mm.	*mm.*
14	♀	Iwahig, Palawan	C. M. Weber	Feb., 1909	21	1	233	106	1,420	320
15	♀	do	do	do	21	1	238	105	1,340	304
16	♂	do	do	do	21	1	219	110	460	85
17	♀	do	do	do	21	1	236	94	1,420	307
18	♀	do	W. Schultze	Mar., 1909	21	1	227	111	465	107

Boulenger [4] gives the number of ventrals of *E. erythruras* as 211–233, of subcaudals as 86–100. It will be noticed that both the ventrals and subcaudals are more numerous in *E. philippina.*

Dendrophis pictus Gmel.*†‡

Found throughout the Philippines, and also in India, Indo-China, the Malay Peninsula and Archipelago.

Dendrelaphis caudolineatus Gray.*†‡

Found in Palawan, Balabac, southern India, the Malay Peninsula and Archipelago.

Oligodon iwahigensis n. sp.†

Maxillary teeth six; two teeth on each palatine. Nasal divided; portion of rostral seen from above much shorter than its distance from the frontal; suture between the internasals slightly shorter than that between the præfrontals; frontal longer than its distance from the end of the snout, a little shorter than the parietals; loreal very small, longer than deep; one prae- and two post-oculars; temporals 1+2; seven upper labials, third and fourth entering the eye; labials in contact with the

[4] *Loc. cit.*

anterior chin-shields, which are longer than the posterior. Scales in 15 rows; ventrals 139; anal entire; subcaudals 36.

Dark purplish brown above, with eleven light brown rhomboidal spots along the back. Lateral scales finely flecked with white dots; here and there a larger white spot. Upper surface of head gray-brown, with a transverse brown band passing through the eye, and a chevron shaped band back of this, having its point confluent with the middle of the anterior band. Lower surface of head and throat whitish, with numerous irregular dark brown splotches. Remainder of ventral surface uniform coral-red.

Total length, 324 millimeters; tail, 57 millimeters.

Iwahig, Palawan; collected by Mr. W. Schultze.

Very much like *O. everetti,* except for color and markings. The portion of the rostral seen from above is much shorter, and the shape of other head scales is slightly different.

It differs from *O. notospilus* in having fewer and smaller dorsal spots, two postoculars in place of one, broader bands on the head, and a different coloration.

Ablabes tricolor (Schleg.).†

Iwahig, Palawan. I believe that this is the first record of this snake being found in the Philippines. It also occurs in Java, Sumatra, and Borneo.

Calamaria everetti Blgr.*‡

Known to occur in Palawan and Borneo. The specimen collected by Weber differs markedly in its coloration from those described by Boulenger. This specimen is black above without spots or markings of any kind except on the neck, where the color is very dark brown, and there is a narrow, incomplete yellowish collar. The upper surface of the head is very dark brown, without darker spots. Each scale of the outer row is yellowish in the center, black on the borders. Lower parts dull yellow, tinged with red. No median dark stripe along the lower surface of the tail.

Total length 315 millimeters; tail 26 millimeters. Scale rows 13; ventrals 174; anal entire; subcaudals 25.

Hurria rhynchops (Schneid.).*‡

Found along rocky coasts throughout the Philippines, and from India to New Guinea and Australia.

Boiga cynodon (Boie).†‡

Found in Palawan, Mindanao, Borneo, the Malay Peninsula and Archipelago.

Boiga dendrophila (Schleg.).*†‡

Found in Palawan, Mindanao, Luzon, Malay Peninsula, Borneo, Sumatra, Java, and Celebes.

Psammodynastes pulverulentus Boie.‡

Recorded in the Philippines from Palawan, Balabac, Mindanao and Luzon. Found throughout southeastern Asia and the Malay Archipelago.

Dryophis prasinus Boie.*†

Found throughout the Philippines, eastern Himalayas, Burma, Indo-China, the Malay Peninsula and Archipelago.

Chrysopelea ornata (Shaw).*†

This is the first record of this snake in Palawan. It is widely distributed throughout the Philippines and all southeastern Asia.

Distira ornata (Gray).*

Iwahig, Palawan. Widely distributed on the coasts of the Indian and western Pacific oceans.

Laticauda colubrina (Schneider).*

Iwahig, Palawan. Very common and of large size among the Visayan Islands. Widely distributed on the coasts of the Indian and Pacific oceans.

Naja naja (Linnæus) var. **miolepis** Blgr.*‡

This variety has not yet been found outside of Palawan and Borneo. In Palawan this cobra is quite common.

Naja naja (Linnæus) var. **cæca** Gmel.*

This variety does not seem to have been captured before in Palawan, or in the southern islands of the Philippines. It is widely distributed in the northern islands, and in India, and has also been found in Java.

The species, with its several varieties, is found throughout southern Asia and the Malay Archipelago.

Naja bungarus Schleg.*

A single specimen, 239 centimeters long, has been collected in Palawan. The species is also found in Luzon. Outside the Philippines it is found throughout India, Burma, southern China, the Malay Peninsula and Archipelago.

Doliophis bilineatus (Peters).*†‡

Found only in Palawan and Balabac. It seems to be very common in Palawan.

Haplopeltura boa (Boie).*‡

To this date this snake has been recorded only from Palawan and Balabac, within the Philippine Archipelago. It is found in Pinang, Borneo, Java, and the Moluccas.

Trimeresurus gramineus (Shaw).*

This is, I believe, the first record of *T. gramineus* occurring in the Philippines. This specimen is dark purplish-blue above, faintly marked

by ill-defined black bars; the upper surface of the head shows a network of faint black lines; belly bluish-green; tail coral-red, the yellow lateral streak being here spotted with purple.

Trimeresurus wagleri (Boie).*†‡

This species has been collected in the Philippines in Palawan, Mindanao, and Albay. Its range includes the entire Malay Archipelago. Two of Schultze's specimens are of a new color variety in which the usual blue or purple lines are replaced by red.

Trimeresurus sumatranus (Raffles).‡

A single specimen was found in Palawan by Everett. Found outside the Philippines in Singapore, Sumatra, and Borneo.

Trimeresurus schultzei n. sp.*

Scales between eyes and gular and occipital scales smooth; scales on body faintly keeled. First lower labial in contact with its fellow behind the symphysial. Tail prehensile; scales in 23 rows; ventrals 203; anal entire; subcaudals 70.

Canthus of snout rounded; diameter of the eye more than half its distance from the tip of the snout. Rostral one-fourth broader than deep; nasal entire; upper head-scales small, smooth, sub-imbricate, rounded behind instead of pointed, irregular in shape and size; 8 between the anterior ends of the supra-oculars; supra-oculars narrow, as long as the diameter of the eye; internasals small, separated by two scales of the same size; a sub-ocular and two or three post-oculars; sub-ocular in contact with the third labial; temporal scales smooth; ten upper labials, the second forming the anterior border of the loreal pit, the third largest.

Olive-green above, with black cross-bars united on the back by zig-zag lines; the dorsal surface of the head marked by a reticulate pattern of distinct black lines; outer row of scales canary-yellow; belly yellowish-green; tail bright red.

Total length, 330 millimeters; tail, 46 millimeters.

Iwahig, Palawan; collected by Mr. W. Schultze.

T. schultzei differs from *T. gramineus* in the following characters: the snout is shorter; the occipital scales are smooth; the inter-nasals are much smaller; the head scales are less pointed and more irregular, imbricating less; the scales of the body are less keeled, the scales are in 23 rows (although *T. gramineus* rarely has 23), ventrals 203; the body is longer in proportion to the tail.

ERRATA.

Page 143, line 26, **Regner** should read **Regener.**

Page 144, lines 5 and 9, **Fisher** should read **Fischer.**

Page 145, line 9, **Fisher** should read **Fischer.**

Page 221, line 13, "**One such schist has been described**" should read, "**One highly siliceous rock has been described.**"

Pages 239–259, in title at top of pages, **Quingan** should read **Quiangan.** In table of Contents, **Quingan** should read **Quiangan.**

Page 415, line 12, **nasal** should read **cephalic,** and **cephalic** should read **nasal.**

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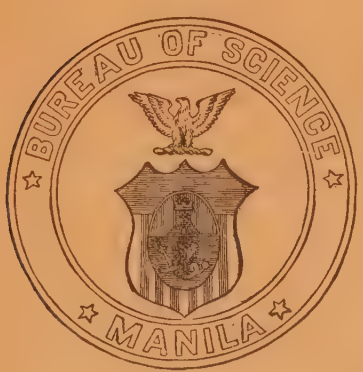

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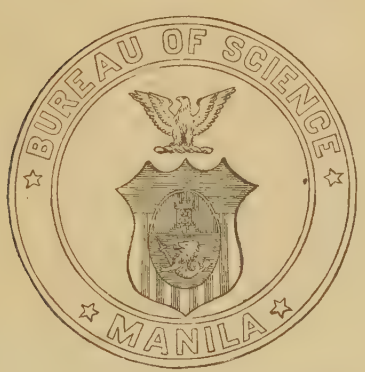

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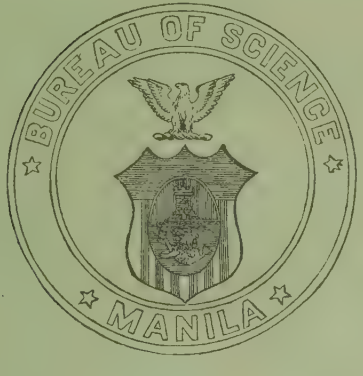

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